CONVALESCENCE AFTER CARDIAC SURGERY:
A DYADIC EXPERIENCE

by

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ABSTRACT

TITLE: **Convalescence after cardiac surgery: A dyadic experience**

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This nonexperimental, longitudinal, correlational study assessed the relative contribution of characteristics of the recovering individual (age, gender, illness severity, and optimism), partner (age, gender, health, emotional distress at hospital discharge, and optimism) and dyad (perceived mutuality from the perspectives of both the recovering individual and partner), and contextual factors in convalescence (physical efficacy, strain and satisfaction in the recovering and caregiving roles) in explaining the variance in activity status and emotional distress of the recovering individual and the emotional distress of the partner 3 months after cardiac surgery in people 65 years of age or older.

The sample consisted of 86 male recovering individuals and their female partners and 21 female recovering individuals and their male partners. Age of the recovering individuals ranged from 63 to 82 years (M = 71.4, SD = 4.1) and of the partners from 49 to 84 years (M = 69.6, SD = 6.9). The majority (72%) had coronary revascularization surgery, the remainder had valvular repair or replacement (21%), or combined procedures (7%).

Data were collected from the recovering individual and partner at the time of hospital discharge and again 3 months after surgery. The medical record was reviewed for data related to the medical illness and surgery. The Duke Activity Status Index (DASI) and Profile of Mood States were used to measure the dependent variables. The Life Orientation Test was used as the measure of optimism, and new measures were developed to assess physical efficacy and strain and satisfaction in the recovering and caregiving roles. With the exception of the DASI and the illness severity index all scales had an internal consistency reliability of greater than .70.

Hierarchical multiple regression was used to test the primary study hypotheses. Partial *F* tests were obtained after the addition of each set of variables, and tested using a significance level of .05. For recovering individual activity status at 3 months, the contributions of each set of variables were as follows: (a) recovering individual characteristics, 36% ($p < .001$); (b) partner characteristics, 2% (*NS*); (c) dyad characteristics, 1% (*NS*);and (d) contextual factors, 6% (*NS*). Total explained variance was 47% (adjusted $R^2 = .36$).

For recovering individual emotional distress at 3 months, the contribution of each set of variables was as follows: (a) recovering individual characteristics, 15% ($p = .005$); (b) partner characteristics, 6% (*NS*); (c) dyad characteristics, 2% (*NS*); and (d) contextual factors, 21% ($p = .001$). Total explained variance was 44% (adjusted $R^2 = .33$).

For partner emotional distress at 3 months, the contribution of each set of variables was as follows: (a) recovering individual characteristics, 9% (*NS*); (b) partner characteristics, 27% ($p < .001$); (c) dyad characteristics, 10% ($p < .001$); (d) contextual factors, 10% ($p = .008$); and (e) recovering individual convalescent phase outcomes, 2% (*NS*). Total explained variance was 60% (adjusted $R^2 = .50$).

Results highlight the important contribution of interactive factors in convalescence after cardiac surgery for older adults. It may be that nursing interventions could be developed to assist the partner in promoting patient recovery while maintaining or promoting his or her own health. New knowledge about the strains experienced in convalescence may help to identify those dyads for whom home health referrals are most effective.

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CHAPTER 1

Introduction

Cardiovascular disease is the leading cause of death for both men and women in the United States and more than one in four Americans are living with some form of cardiovascular disease (American Heart Association, 1992). In 1989 approximately 424,000 people, more than half (52%) of whom were 65 years of age or older, experienced either coronary artery bypass surgery or cardiac valve surgery (American Heart Association, 1992). From 1981 to 1985 the number of patients age 65 and older discharged from hospitals after coronary artery bypass or cardiac valve surgery more than doubled (Anderson, Newhouse, & Roos, 1989). Nevertheless, older people have been excluded from the majority of published studies of recovery after cardiac surgery. Therefore, we do not know what the experiences of older adults are or what unmet needs for nursing care might exist during convalescence. Knowledge about the experiences and needs of younger people may be inadequate for guiding the nursing care of older adults.

In the Western region of the United States, average length of hospital stay for cardiovascular surgical patients age 65 and older is 8.4 to 13.5 days (HCIA Inc., 1992). The majority of patients are discharged home after approximately 1 week to care for themselves with the help of their family and friends. Short hospital stays imply that patients and families assume responsibility for monitoring and maintaining the recovery process, detecting deviations from the expected course, and initiating corrective action while the potential for instability is greater than it would be later in convalescence. The patient and family have little time to adjust to the surgery before they are asked to learn to manage the recovery process; the nurse has little time to prepare the patient and family for the potentially complex home management.

When couples return home from the hospital they must incorporate the management of the recovery process within the context of their daily lives (Corbin & Strauss, 1988). The interaction of demands posed by the surgery and the demands of daily living may increase the strain associated with recovery and caregiving. The physical health of the caregiver and the utilization of outside services may also be significant factors. Johnson reported that 45% of the older adults in need of family supports while recuperating from a hospital stay relied upon a spouse (Johnson, 1985). Almost one half (48%) of these spousal caregivers reported that their physical health posed a problem for them in caregiving, yet the use of formal supports was lower among married than unmarried people.

Both patient and spouse are affected by the surgery and each may influence the process of recovery. Among middle-aged couples after cardiac surgery, mood disturbance was present in both the patient and spouse and, for the spouse, did not decrease from 1 to 3 months after surgery (Rankin, 1992). Concordant (patient and spouse) low psychological adjustment 1 month after cardiac surgery was a significant predictor of the patient's physical functional status 6 months after surgery (Allen, Becker, & Swank, 1991). Although intriguing, it is not known if these findings also pertain to older adults.

Very little is known about older couples' experiences during the convalescent phase after cardiac surgery or about factors that influence the experience. The only reports in the literature about the experience of older adults having cardiac surgery are by Gortner (Gortner, Harr, Paul, & Hlatky, 1992;

Gortner, Rankin, & Wolfe, 1988). The first is limited to 11 patients and the second is a poster presented at the 65th Scientific Sessions of the American Heart Association. Preliminary analysis revealed some differences for older patients when compared with younger (e.g., fatigue persisted longer into recovery, older patients were more likely to achieve their expected benefits from surgery).

Taken together, the prevalence of cardiovascular surgery among older adults and the pressures of short hospital stays on the patient, the family, and the nurse demand that the knowledge deficit related to the older adults' experience after cardiac surgery be resolved. The acute care nurse, the recovering individual, and the family caregiver need to know what is essential information and how it can be communicated most efficiently given the constraints of the situation. Detailed examination of the recovery process and its associated strains and satisfactions has immediate relevance for patient and family education and counseling.

The identification of potentially modifiable factors that are within the domain of nursing and are related to positive convalescent-phase outcomes could provide new paths for nursing intervention. Better understanding of the partner's role in and effect on recovery after cardiac surgery, together with an understanding of the strain and satisfaction experienced by the recovering individual and partner during convalescence, could help to focus nursing intervention in convalescence. Goals of nursing intervention would include assisting the partner in promoting patient recovery while maintaining or promoting his or her own health. New knowledge about the strains experienced in convalescence could help to identify those dyads for whom home health referrals are most effective.

For purposes of this study, recovery has been conceptualized as consisting of three phases: hospital phase, convalescent phase, and rehabilitative phase. This study is concerned with the convalescent phase of recovery that begins with hospital discharge and extends for approximately three months after surgery. The overall purpose of this study was to examine the role of selected individual and dyadic variables in convalescence after cardiac surgery in people 65 years of age and older. It was predicted that characteristics of the recovering individual, the partner, and the dyad, together with contextual factors in convalescence, would each contribute to the explained variance in the physical activity status of the recovering individual 3 months after cardiac surgery and to the explained variance in emotional distress of both the recovering individual and partner 3 months after cardiac surgery.

CHAPTER 2

Review of the Literature

Recovery from serious illness, such as an acute cardiac event, is a multidimensional process involving physical repair, restoration of a sense of psychological well-being, and return to normal social functioning (Croog, Levine, & Lurie, 1968; Kasl & Cobb, 1966; Winefield & Cormack, 1986). The recovery period can be conceptually divided into three phases: hospital phase, convalescent phase, and rehabilitative phase. The purpose of this review is to evaluate and summarize the existing evidence about factors influencing the recovery process after an acute cardiac event. The literature reviewed encompasses studies of cardiac recovery overall and is not limited to convalescent phase studies. The basic question guiding this review is to what extent can physical and psychosocial factors explain variation in the recovery process after an acute cardiac event? Appendix A provides additional details about the studies cited in text.

Coronary artery bypass surgery, cardiac valve repair or replacement surgery, and myocardial infarction are acute events that may occur within the chronic illnesses of coronary or valvular heart disease. Questions may be raised regarding similarities and differences in the process of recovery from each of these events. Jenkins and colleagues (Jenkins, et al., 1983) discovered that there were no significant differences between subjects recovering from coronary bypass, cardiac valve, or combined bypass and valve surgery on a number of biomedical, psychological, and social outcomes. Because cardiac surgery and myocardial infarction differ in their effect on the heart and activation of physiological responses, it can be logically assumed that there would be differences in the physical repair process. Because both are life-threatening cardiac events that are, at best, temporarily disruptive to psychological and social functioning, it can be assumed that there would be similarities in the restoration of psychological well-being and social function.

The primary focus of this review is the physical and psychosocial processes involved in recovery after coronary artery bypass, cardiac valve repair and replacement, and combined cardiac surgical procedures. The literature related to recovery after myocardial infarction is included as it relates to the restoration of psychological well-being and social function.

Physical Factors in Recovery

Physical repair involves the reestablishment of physiological homeostasis and wound healing. Much of the work of physical repair is completed before the patient is discharged from the hospital. Transition from the hospital to the home occurs after some degree of biological stability and medical predictability are achieved. Home convalescence requires completion of the repair processes initiated during hospitalization and, for some people, may involve achieving a higher level of physical fitness and activity than existed before surgery. Among the physical characteristics of the cardiac patient that may influence the physical repair processes are age, gender, and illness severity.

Age

Older age may adversely influence physical repair after cardiac surgery. In general, older adults have less functional reserve in major body systems than do younger adults and physiological capacity may be exceeded during times of high demand (Kenney, 1985). In addition, there is an age-associated increase in the incidence of coexisting chronic illnesses, which might increase physiological vulnerability (U. S. Senate Special Committee on Aging, 1986).

Characteristics of heart disease may be different when expressed later in life. In comparison with younger patients, older patients are more likely to have left main coronary artery disease, diffuse coronary artery disease, and a reduced left ventricular ejection fraction (Edwards, et al., 1991; Loop, et al., 1988; Rose, et al., 1985; Winslow, Kosecoff, Chassin, Kanouse, & Brook, 1988). Among younger (≤ 66 years), male (90.3%) subjects in the Coronary Artery Surgery Study (CASS), these characteristics of coronary heart disease were shown to benefit more from surgical than medical intervention (CASS, 1983a; CASS, 1983b). However, in comparison with patients without these characteristics, those with left main coronary artery disease, diffuse disease or a reduced left ventricular ejection fraction were more likely to experience perioperative infarction and less relief of angina after repeat coronary artery bypass surgery (Loop & Cosgrove, 1986). Because repeat operations are more common among older than younger patients, the disease characteristics that make surgery a desirable treatment option for older adults may also reduce the expected benefit of repeat bypass surgery.

The perioperative mortality rate among CASS subjects (limited to relatively healthy patients under 66 years of age) was 1.4%; and, significant differences in physical activity, anginal symptoms, and survival were reported among subsets of the surgically and medically treated groups (CASS, 1983a; CASS, 1983b). Perioperative mortality rates associated with coronary bypass surgery in older patients ranged from 3 to 7.4% (Edwards et al., 1991; Gersh, et al., 1985; Loop et al., 1988; Rich, Sandza, Kleiger, & Connors, 1985; Rose et al., 1985), while mortality after valve repair and replacements ranged from 9.5 to 20% (Fiore, et al., 1989; Rich et al., 1985). After surgical intervention and recovery, a large majority (74 to 89%) of older patients were free of angina (Loop et al., 1988; Rich et al., 1985), and the survival rate of those who survived hospitalization was better than the survival rate of the U. S. population adjusted for age and gender (Loop et al., 1988).

Direct comparison of mortality rates for younger and older patients is not meaningful because of differences in study design and methods. The CASS was a multicenter, randomized clinical trial, but subjects were primarily white (98.3%), middle-aged (*M* = 51.2 years, *SD* = 7.4 years) males (90.3%) with relatively mild coronary artery disease (functional class I or II) (CASS, 1983b). The data about older adults come from several retrospective case-series analyses. Patients in these series were older, included more women, and, in general, had more severe coronary artery disease than patients in the CASS sample. Case series that explored the relationship between age and outcome after cardiac surgery grouped subjects over a specified age (e.g., over 65, 70, or 80 years) and reported outcomes for the group, thus obscuring the heterogeneity known to exist among older adults. Despite the limitations of case-series data, clinical scientists concluded that cardiac surgical procedures may be performed in older adults without prohibitive perioperative mortality, with significant lessening of symptoms, and with increased long-term survival (Gersh et al., 1985; Loop et al., 1988; Rich et al., 1985; Rose et al., 1985). None of these studies, however, provide information about the older person's experiences during the convalescent phase of recovery.

In the Improving Recovery Study, Gortner and her colleagues (Gortner et al., 1988) found that a subsample of patients aged 70 to 77 years ($n = 11$) described the convalescent phase of recovery from cardiac surgery as fatiguing for both the patient and partner. Fatigue persisted longer into the recovery period for older than for younger patients recovering from cardiac surgery. Older patients described problems in convalescence related to infection, medication toxicity, exacerbation of other chronic illnesses, and dysrhythmias. Nevertheless, they were more likely to achieve their expected benefits from surgery and to score lower on the anger-hostility scale of the Profile of Mood States than were patients under 50 years of age. Older patients' anger-hostility scores in Gortner's report were not significantly different from those reported in a larger sample of healthy older adults (Kaye, et al., 1988). More recently, Gortner reported that a cohort of 129 subjects age 70 or older experienced a significant increase in perceived quality of life from baseline to 2 months after surgery ($F = 4.36$, $p = .02$), but a decrease in their expectation for recovery of health measured 1 month after surgery ($F = 29.48$, $p < .001$) (Gortner et al., 1992). Quality of life and perceived recovery of health were both measured on a 10-point scale, with a mean preoperative quality of life score of 6.5 and a mean preoperative expected recovery of health score of 9.1.

Gender

Coronary heart disease is well known to be a leading cause of mortality among American men. That it is also the number one killer of American women is less well known (American Heart Association, 1992). In 1989, approximately 240,000 women in the U.S. died from coronary heart disease, 71,000 women had coronary artery bypass surgery, and an additional 25,000 women had valve repair or replacement surgery (American Heart Association, 1992). Yet, until recently, most studies of cardiac disease, surgery, and recovery excluded women. The growing knowledge base related to women's experience of coronary heart disease indicates that it may be different from men's experience.

In general, women are less likely than men to undergo cardiac catheterization or coronary bypass surgery despite more severe functional limitation from heart disease (Ayanian & Epstein, 1991; Bickell, et al., 1992; King, Clark, & Hicks, 1992; Krumholz, Douglas, Lauer, & Pasternak, 1992; Steingart, et al., 1991). Some investigators report that women have more severe heart disease than men do at the time of surgery (Stanton, Jenkins, Savageau, & Thurer, 1984; Zyzanski, Stanton, Jenkins, & Klein, 1981), are more likely to die in surgery and in the first 6 weeks afterward than men (Maynard, Litwin, Martin, & Weaver, 1991; Rankin, 1990), and that the predictors of surgical mortality for men and women are different (King et al., 1992). However, it also has been reported that women who had initial cardiac catheterization were older, had more coexisting chronic illnesses, and had less severe coronary artery disease than did men (Jollis, Lam, Shaw, Pryor, & Mark, 1992). While the number of women having cardiac surgery appears to be increasing, women are more likely to have valve repair or replacement surgery than coronary artery bypass surgery (American Heart Association, 1992; Gilliss, 1993).

Studies of gender differences in recovery after cardiac surgery are inconclusive. Some investigators reported that women had longer intensive care unit and hospital stays (Rankin, 1990), were less active or more functionally limited postoperatively (Gortner & Jenkins, 1990; Kos-Munson, Alexander, Hinthorn, Gallagher, & Goetze, 1988; Stanton et al., 1984), were more likely than men to report angina and dyspnea postoperatively (Yates, 1987; Zyzanski et al., 1981), and were less likely to realize their expected benefits from surgery (Gortner, et al., 1988). Others reported that men and women did not differ in biophysical measures, sexual activity, recreation, or return to work at 1 and 3 months of recovery, but that women reported less emotional disturbance than did men during convalescence (Gilliss, Neuhaus, & Hauck, 1990; Rankin, 1990). The conflicting results may be explained, in part, by the relatively small number of women in most studies. In addition, age may confound the effects of gender, since women are likely to be older at the time their heart disease becomes symptomatic. Increasing age is associated with increased incidence of coronary heart disease in both sexes. In men, the incidence of coronary heart disease increases steadily with age; but in women, the incidence increases dramatically after menopause. Therefore, the population of older patients undergoing cardiac surgery can be expected to include a larger proportion of women than does the middle-aged patient group, and women can be expected to be older at the time of diagnosis and treatment.

Illness Severity

Illness severity refers to the medically determined threat of death or serious harm associated with an illness or surgical procedure. Two aspects of illness severity that logically might be expected to influence recovery from cardiac surgery are the severity of cardiac disease and the severity of coexisting chronic illnesses.

The CASS demonstrated a relationship between severity of cardiac illness and survival (CASS, 1983b). In patients with three-vessel disease and an ejection fraction less than 50%, a trend for increased survival in the surgically treated group, as compared with the medically treated group, was observed at 5 years (*p* = .06) that became significant at 7 years (*p* <.01). In other studies, longer duration of angina was significantly associated with postoperative unemployment ($\chi^2_{[1, N = 30]} = 4.8$, $p < .05$) (Gundle, Reeves, Tate, Raft, & McLaurin, 1980), with impaired sexual function ($\chi^2_{[1, N = 30]} = 16$, $p < .01$) (Gundle et al., 1980), but with greater postoperative morale in males (partial $r = .26$, $p < .05$) (Brown & Rawlinson, 1976).

The Recovery Study, a large ($N = 470$) multicenter study conducted in 1979-1980, examined the course of convalescence and rehabilitation after cardiac surgery (Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983; Jenkins et al., 1983). Sampling criteria resulted in a relatively healthy, middle-aged ($M = 54.4$, *SD* not reported) group that was predominantly male (84%). In the study, perceived severity of angina was a significant predictor of work status while more objective indicators (i.e., duration of illness, previous myocardial infarction, and ejection fraction) were not (Stanton, et al., 1983). Other investigators who included illness severity in multivariate analyses either as covariates (Gilliss, Gortner, Hauck, Shinn, & Sparacino, 1993) or predictors (Allen, Becker, & Swank, 1990; O'Connor, 1983) of physical repair reported differing results. In two studies, severity of illness was not significantly related to postoperative physical functioning (Allen et al., 1990; O'Connor, 1983). In another study, however, the set of age, sex, type of surgery, and preoperative New York Heart Association (NYHA) functional class was a significant covariate (R^2 change = .10, $p = .01$) of patient activity level at 24 weeks after surgery, and NYHA functional class 4 weeks after surgery was a significant predictor

(R^2 change = .03, p = .04) of quality of life 24 weeks after surgery (Gilliss et al., 1993).

Limited evidence is available about the influence of coexistent illnesses, since many investigators who explored factors related to recovery after surgery excluded patients with significant coexisting illnesses. In one study, however, comorbidity (the presence of coexistent illnesses) was used successfully to predict postoperative length of hospital stay after cardiac surgery (p <.01) (Jollis, et al., 1991). In another study incorporating comorbidity, concordant (patient and spouse) low psychological adjustment, age, chronic medical problems, and number of bypass grafts explained 12% of the variance in physical functional status 6 months after surgery (Allen et al., 1991). However, only concordant low psychological adjustment was a significant independent predictor (β = .34, p < .02) (Allen et al., 1991).

Summary of Physical Predictors of Recovery

Although physical factors of age, severity of illness, and gender have been shown to influence perioperative morbidity and mortality, with the exception of age, they have been unable to explain significant amounts of the variance in physical functional status or activity during convalescence. In patients less than 66 years old, age has been reported to explain from 2% to 11% of the variance in measures of physical function (Allen et al., 1990; Kos-Munson et al., 1988; O'Connor, 1983) and, in patients less than 60 years old, to be a significant predictor of return to work (Stanton et al., 1983). Some evidence exists that postoperative physical condition is associated with postoperative psychological status (Allen et al., 1991; Gilliss et al., 1993). However, the large majority of these studies excluded patients age 65 years or older and very little evidence exists about factors associated with physical recovery in older adults.

Psychosocial Factors in Recovery

An extensive review of the literature related to recovery from the acute onset of arteriosclerotic cardiac disease was published in 1968 (Croog et al., 1968). Physiological factors were found to be useful in defining the limits of recovery, but were only partially predictive of subsequent levels of activity (Croog et al., 1968). Psychosocial factors, including the patient's premorbid personality patterns, defense mechanisms, and conceptions of the sick role, were identified as individual patient characteristics that might influence the process and level of recovery achieved. Relationships with the physician and the family were reviewed as possible contributing social factors. The family was described as the context for recovery with individual family members and the family system as a whole responding to the crisis of heart disease and influencing the recovery process. The authors commented on the exploratory nature of most of the work and concluded that scientific study of the recovery process was in the seminal stages.

A similar review was published in 1977 that focused on papers related to recovery from a myocardial infarction that were published after the review by Croog and colleagues (Doehrman, 1977). Although not limited to research reports, the bulk of the review focused on empirical work classified into prehospital, hospital, and posthospital phases of recovery. Doehrman concluded that emotional distress reached its peak during the posthospital phase; that although the majority (85%) of patients returned to work by 1 year, a significant minority (25%) continued to experience significant anxiety and depression; and that many psychological and social counseling programs appeared to reduce distress. The relationship between psychosocial characteristics and adjustment after a myocardial infarction was minimal and the results of the studies reviewed were contradictory. His overall conclusion was that the state of existing knowledge was ready for large-scale clinical studies designed to test theories of psychosocial rehabilitation.

Neither of these extensive reviews addressed the recovery of people having cardiac surgery. The first was published before cardiac surgery was widely practiced, and the second purposely excluded work in this area. However, both summarized evidence of the importance of psychosocial factors in the recovery process of medical cardiac patients. This section of the literature review focuses on more recent work and concepts shown to have importance in surgical recovery, including self-efficacy, dispositional optimism, sociodemographic factors, social integration, and the influence of a spouse.

Self-efficacy

Self-efficacy, the personal conviction of one's ability to perform the actions necessary to achieve a desired outcome, is one psychological factor that has been shown to explain some of the individual variation in recovery after myocardial infarction (Ewart, Taylor, Reese, & DeBusk, 1983) and after cardiac surgery (Allen et al., 1990; Gilliss et al., 1993; Gortner et al., 1988; Gortner & Jenkins, 1990; Gulanick, Kim, & Holm, 1991). In 40 male patients 3 weeks after a myocardial infarction, physical self-efficacy after treadmill testing was more highly correlated with subsequent home activities (r = .34 to .50, p < .01) than was maximum heart rate achieved on the treadmill (r = .08 to .30, *NS*) (Ewart et al., 1983). In 125 postoperative cardiac patients, self-efficacy expectations to perform independent activities of daily living measured at the time of hospital discharge explained 20% of the variance in daily household activities at 6 months (Allen, 1990). Self-efficacy expectations for activity, in general, were found to increase over time through convalescence and to exceed the reported level of actual activity in both medical and surgical cardiac patients (Gortner & Jenkins, 1990; Gulanick et al., 1991).

Self-efficacy expectations may be affected by nursing and medical intervention. Self-efficacy scores of male patients 3 weeks after a myocardial infarction changed after formal exercise testing and after subsequent counseling (Taylor, Bandura, Ewart, Miller, & DeBusk, 1985). Men with low self-efficacy scores who did well on the treadmill test had significant posttreadmill increases ($p < .01$) in self-efficacy for activities closely related to treadmill performance, i.e., running a block, walking, and general exertion; men who did poorly on the treadmill did not have a significant increase in their self-efficacy scores (Ewart et al., 1983). Posttreadmill counseling by a physician and nurse, in which the results of the test and its meaning were explained, produced a significant additive effect on general exertion self-efficacy scores, and also increased self-efficacy scores for activities less closely related to treadmill performance (i.e., sexual activity and lifting) (Ewart et al., 1983). In another study, it was demonstrated that not only the patient's perceived ability to withstand increases in heart rate ($r = .40$, $p < .03$), but also the spouse's perception of the patient's efficacy ($r = .43$, $p < .03$), were associated with patient treadmill performance (Taylor et al., 1985). Furthermore, the combined efficacy rating of patients and their wives was found to be the most consistent predictor of patients' cardiovascular functioning during exercise testing ($r = .48$, $p < .001$) (Taylor et al., 1985).

Building on this work with patients after a myocardial infarction, Gilliss and her colleagues conducted a randomized clinical trial with cardiac surgical patients testing a psychoeducational nursing intervention intended to enhance recovery by increasing self-efficacy, the Improving Recovery Study (Gilliss et al., 1993). The intervention consisted of supplemental in-hospital education for patients and their partners on the emotional response to surgery and weekly postdischarge nurse-initiated phone calls during the first 4 weeks at home and again at 6 and 8 weeks. The phone calls were intended to provide support to the patients and their partners, to reinforce the supplemental education they had received in the hospital, and to provide coaching and encouragement related to activity. Patient outcome measures were self-efficacy expectations, self-reported level of activity, quality of life, and mood state.

The sample consisted of 156 patients and their primary caregivers, with 81 pairs assigned to the control group and 75 to the experimental group. Patients ranged in age from 25 to 75 years (control group $M = 59.8$, $SD = 10.3$; experimental group $M = 59.2$, $SD = 9.8$), and were predominantly white (92%) males (80%). Preoperatively, no statistically significant differences existed between the experimental and control groups on the variables of interest. In general, the experimental group reported more activity at 4 and 12 weeks after surgery than did the control group, although these differences were significant only for walking and lifting. In repeated measures analysis, a significant effect for treatment was demonstrated for increased self-efficacy for walking ($p = .01$), and for self-reported walking ($p = .01$), and lifting ($p < .03$). Significant effects for time were demonstrated for all self-efficacy and activity measures ($p < .001$). A significant interaction effect (group x time) was demonstrated for self-efficacy for lifting, reported lifting, and quality of life. There were no significant treatment effects on quality of life or mood state.

Dispositional Optimism

Dispositional optimism refers to the generalized expectation that good, as opposed to bad, outcomes will occur when confronting important life events; it is conceptualized as a relatively stable personality trait (Scheier & Carver, 1985). An increasing body of literature demonstrates linkages between optimism and psychological well-being and physical health (Peterson, Seligman, & Vaillant, 1988; Scheier & Carver, 1987; Scheier, et al., 1989; Seligman, 1991). For example, in a 35-year longitudinal study of male Harvard graduates, those who used optimistic explanations for bad events at age 25 were healthier at age 45 through age 60 than were men who used pessimistic explanations (Peterson et al., 1988). The magnitude of association was greater at age 45 (partial $r = .37$, $p < .001$) than at older ages.

In a study of 51 middle-aged ($M = 48.5$, $SD = 6.5$) males recovering from first-time coronary artery bypass surgery, optimists recovered faster and experienced fewer surgical complications than did pessimists (Scheier et al., 1989). Optimists were more likely than pessimists to have resumed vigorous physical activity ($F_{1,43} = 5.13$, $p < .03$) and to have returned to full-time work ($F_{1,42} = 3.66$, $p < .07$) 6 months after surgery (Scheier et al., 1989). Optimists were more likely than pessimists to report seeking out information about the recovery process ($F_{1,46} = 4.52$, $p < .04$) and were less likely than pessimists to report being helped by thinking about the negative aspects of their experience ($p < .05$) or by attempting to ignore or not think about what recovery would be like in the months ahead ($F_{1,44} = 4.20 p < .05$). The investigators concluded that pessimists were at risk for a difficult and delayed recovery and engaged in coping behaviors that reduced their likelihood of obtaining assistance with recovery.

Income, Education, and Ethnicity

Evidence exists that income and ethnic group membership influence the clinical course of cardiac disease. Family income was related positively to survival with cardiac disease (Williams, et al., 1992), achievement of optimal rehabilitation (Kos-Munson et al., 1988), life satisfaction (Flynn & Frantz, 1987), and return to work (Stanton et al., 1984) after cardiac surgery. Educational level, used as a proxy for income by some investigators, showed similar positive relationships (Stanton et al., 1983; Zyzanski et al., 1981).

Among patients with angiographically documented coronary artery disease ($N = 1368$), those with higher household income levels (≥ $40,000) had better survival (adjusted $\chi^2 = 10.9$, $p = .01$) while those with low annual incomes (< $10,000) were nearly twice as likely to die within 5 years of angiography (Williams et al., 1992). The relationship between income level and survival was independent of age, disease severity, and gender (Williams et al., 1992). Among patients with coronary bypass surgery, family income was reported to be a significant predictor of sickness impact (F change = 6.0, $p = .01$, $N = 92$) (Kos-Munson et al., 1988) and return to work ($\chi^2_{[3,\ N = 135]} = 24.23$, $p < .001$) (Stanton et al., 1983), while satisfaction with income level was a predictor of life satisfaction (Flynn & Frantz, 1987).

A recent analysis of national data examined differences in the rates of coronary artery bypass surgery between white and black Medicare patients (Goldberg, Hartz, Jacobsen, Krakauer, & Rimm, 1992). The national rate of coronary artery bypass grafting for white Medicare recipients was 27.1 per

10,000 (40.4 for white men, 16.2 for white women), but only 7.6 per 10,000 for black Medicare recipients (9.3 for black men and 6.4 for black women). These differences could not be explained on the basis of differences in incidence of coronary heart disease. Among patients in Veterans Affairs Hospitals, whites were more likely than blacks to undergo cardiac catheterization, percutaneous transluminal angioplasty, or coronary artery bypass surgery (Whittle, Conigliaro, Good, & Lofgren, 1993). These findings within the Veterans Affairs hospitals imply that neither financial incentive nor health insurance are explanatory factors in the observed racial difference. It is unknown whether invasive cardiac procedures are underutilized in blacks or overutilized in whites.

Social Integration

Membership in a close social unit appears to influence the experience of coronary heart disease. In a study of patients following a myocardial infarction ($N = 1234$), living alone was an independent risk factor predicting a major cardiac event (either nonfatal re-infarction or cardiac death) (Case, Moss, Case, McDermott, & Eberly, 1992). The risk for a recurrent event was higher for women than for men living alone (hazard ratio for women = 2.54, for men = 1.24; $p = .14$). Similarly, for patients with angiographically documented coronary heart disease ($N = 1,368$), married patients of both genders had better survival rates than did unmarried patients (adjusted $\chi^2 = 4.6$, $p = .03$) (Williams et al., 1992). A statistical interaction between marital status and having a confidant was reported such that unmarried patients without a confidant had an unadjusted 5-year survival rate of 0.50, compared with 0.82 for patients who were married, had a confidant or both ($p < .01$) (Williams et al., 1992).

Response of Spouse to Surgery

Cardiac surgery and myocardial infarction are disruptive life events affecting both the patient and the family. During convalescence, patients, spouses, and children all experience strain related to change in family and social activities, change in role expectations, and disruption of familiar routines (Gilliss, 1984; Hilgenberg & Crowley, 1987). Emotional disturbance was reported by spouses during convalescence (Gortner et al., 1988; Rankin & Monahan, 1991; Sikorski, 1985) and for up to 1 year after the acute event (Mayou, Foster, & Williamson, 1978).

Rankin examined the burden associated with caregiving after cardiac surgery in middle-aged (M = 58.3 years, SD not reported), male (n = 23) and female (n = 94) spouses (Rankin, 1992; Rankin & Monahan, 1991). Although the burden scores were relatively low at both measurement times compared with caregivers of patients with dementia, caregiving burden did not decrease over time as might have been predicted (1 month after surgery, M = 16.02, SD = 9.14; 3 months after surgery, M = 17.17, SD = 10.55). Another interesting finding in Rankin's study was that total mood disturbance scores decreased from 1 month to 3 months after surgery, but were not significantly different between the patient and spouse at either time. These findings support the need to understand the process of recovery from the perspective of both the patient and spouse.

Influence of Spouse on Recovery

Some evidence exists that the spouse has a beneficial influence on physical repair and on psychosocial readjustment after cardiac surgery. Married cardiac surgical patients who were visited frequently by their spouses during the hospital recovery phase took fewer pain medications (t_{42} = 2.76, p = .02) and were released from intensive care ($F_{1,52} = 6.73$, $p = .02$) and from the hospital ($F_{1,52} = 5.44$, $p = .02$) earlier than unmarried patients (Kulik & Mahler, 1989). The perceived quality of the marital relationship was generally a nonsignificant factor, although variability was limited as over 71% reported their relationships were excellent (Kulik & Mahler, 1989).

Allen and her colleagues (Allen et al., 1991) found that the psychological adjustment score of the spouse was lower (poorer adjustment) 1 month after surgery than was that of the patient. In stepwise multiple regression analysis, concordant (patient and spouse) low psychological adjustment 1 month after surgery, patient age, chronic medical problems, and number of bypass grafts explained 12% of the variance in physical functional status at 6 months after surgery. Of these predictors, only concordant low psychological adjustment was a significant independent predictor ($\beta = .342$, $p = .02$). Although the direction of association cannot be determined from correlational data, these data demonstrate an association between caregiver strain and patient recovery after cardiac surgery.

In recovery after myocardial infarction, wives' attitudes (e.g., encouragement, over-protectiveness) and behaviors (e.g., knowledge enhancement, instrumental support) were significant factors associated with the rate of recovery and extent of readjustment (Ben-Sira & Eliezer, 1990; Mayou et al., 1978). Family support was a significant predictor of lower emotional distress ($\beta = -.19$, $p < .01$) and higher self-esteem ($\beta = .25$, $p < .01$) of patients 1 month after a myocardial infarction (Riegel & Dracup, 1992). In a small exploratory study ($n = 17$), spouse family stress ($r = .42$, $p = .09$), marital satisfaction ($r = .42$, $p = .10$), and sexual comfort ($r = .42$ to $.53$, $p = .10$ to $.03$) were associated with patient recovery 3 months after a myocardial infarction (Beach, et al., 1992). The combined perception of patients and their wives concerning the patients' cardiac capabilities was the most consistent predictor of patients' cardiovascular function, whether measured as maximal workload or heart rate during exercise testing, 11 and 26 weeks after a myocardial infarction (Taylor et al., 1985).

Summary of Psychosocial Predictors of Recovery

Selected psychosocial characteristics of the patient and spouse have been shown to be associated significantly with the process of recovery. The literature indicates that perceived self-efficacy was a significant factor related to activity level during convalescence after either a myocardial infarction or cardiac surgery. Spouses' perception of patient efficacy contributed to cardiovascular capability. Self-efficacy was a factor that could be manipulated by medical and nursing intervention, with different types of intervention producing qualitatively similar, although quantitatively different, results. Dispositional optimism was reported to be associated with more physical activity and fewer complications after cardiac surgery. Social factors including income, education, ethnic group membership, and living with others was reported to influence the clinical course of cardiac disease and treatment. In patients recovering after cardiac surgery, higher family income was associated with less physical and psychosocial impairment and more life satisfaction. The presence of a spouse was associated with the use of fewer analgesics, earlier discharge from the intensive care unit, and earlier hospital discharge. Congruent (patient and spouse) low psychological adjustment after surgery was associated with less physical activity. However, the large majority of these studies that examined the influence of psychosocial factors on recovery excluded older adults. Only Gortner and her colleagues have focused explicitly on the experience of older adults during the convalescent phase of recovery.

Conceptual Framework

From the review of the literature and the investigator's clinical practice, it is clear that both individual and interactive processes are significant factors influencing patient recovery after cardiac surgery. The theoretical viewpoints that inform this study are symbolic interaction (Burr, Leigh, Day, & Constantine, 1979) and social cognition (Bandura, 1986; Peterson & Bossio, 1991). This section begins with a general discussion of these two theoretical viewpoints, followed by the conceptual model for the study with its concepts and proposed interrelationships.

Symbolic Interaction and Role Theory

Symbolic interaction is a school of thought that is concerned with how people gain meaning from or assign meaning to their experiences. Interaction theorists believe that an individual's perception of an experience and the meaning assigned to it result from the incorporation of both subjective and objective parts of the experience. Meaning rests in the symbols and labels associated with experience and is created through interaction with significant others. The meaning assigned to the experience by the individual determines the behavioral response that is made (Burr et al., 1979). For example, cardiac surgery is an objective event; however, the response of the recovering individual to surgery will be determined, in part, by the meaning assigned to the surgery. Among possible meanings, cardiac surgery may be seen as an opportunity to gain control of a chronic illness or as another adverse event in a relentless, downhill trajectory. The meaning assigned to the surgery depends, in part, on the individual's characteristics, but is shaped also by the responses of significant others in the social environment. The meaning surgery takes on through interaction will affect the psychological and behavioral response to surgery.

Role theory is a theoretical orientation within the school of symbolic interaction. Role theorists believe that the behavior of individuals is determined to varying degrees by social relationships and societal norms. Individuals within a defined social group (e.g., a family) take on certain patterns or usual ways of behaving; roles are defined as the integrated set of expected behaviors that distinguish members of a social group (i.e., mother behaves in characteristic ways that differ from father) (Burr et al., 1979). Philosophical debate exists among role theorists regarding the extent to which roles and behaviors are determined by society and the extent to which they emerge within the situation or are created by the individual within the role. From the perspective of an interactional role theorist, roles are created, stabilized, and altered through interactions with others in complementary roles, while societal norms have relatively less influence on role enactment.

Complementary roles involve mutual reciprocal expectations, obligations and satisfactions (Biddle, 1979). The way the sick person or recovering individual enacts his or her role influences the enactment of the partner or caregiving role, and the way the partner-caregiver enacts his or her role may stabilize or alter the recovering individual's role enactment. Role strain is the felt difficulty in fulfilling role obligations that occurs when an individual is unable to meet, or has difficulty meeting, the expectations associated with a role (Burr et al., 1979). Role satisfaction refers to the affective sense of gratification or pleasure experienced in a role (Burr et al., 1979). In the example of the individual recovering from cardiac surgery, role strain might be associated with attempts at cardiovascular risk-factor modification. Simultaneously, the recovering individual might feel satisfied that he or she managed to walk three times a week despite the associated strain.

Social Cognition

Social cognitive theory examines the mental processes whereby symbolic representations (e.g., thoughts, beliefs, attitudes) are converted into behavior (Bandura, 1986). While recognizing the importance of the physical and social environment, social cognitive theorists place relatively more emphasis on elements within the individual as determinants of behavior. Two intrapersonal concepts, optimism and self-efficacy, have particular relevance for this study.

Dispositional Optimism

Dispositional optimism refers to one's positive expectation of what the future holds and is a set of beliefs that influences behavior (Scheier & Carver, 1987). The expectation for good outcomes is believed to be independent of its source (i.e., self, environment, or luck). Scheier and Carver suggest that optimism may effect physical well-being by at least two, not mutually exclusive, mechanisms. First, differences between optimistic and pessimistic ways of appraising a situation or stressor may result in the selection of more or less effective coping behaviors. Second, optimistic or pessimistic ways of thinking may have a direct physiologic effect on neuroendocrine or immune processes (Scheier & Carver, 1987). These authors suggest that outcome expectancies may be particularly important determinants of behavior when the individual has no previous experience with the situation or when the event evolves over a long period of time (Scheier & Carver, 1987).

Self-efficacy

Self-efficacy is defined as an individual's assessment of his or her ability to perform the necessary actions to achieve a specified outcome (Bandura, 1977). Efficacy expectations are derived from four principal sources of information: physiological states, actual experience, vicarious experience, and verbal persuasion. Expectations of efficacy determine whether an action will be initiated, how much effort will be expended, and how long it will be sustained in the face of adversity. Efficacy expectations are causally prior to and must be differentiated from outcome expectations. Efficacy expectations are judgments about one's ability to accomplish a certain course of action. Outcome expectations are judgments about the likely result of successful completing the course of action. Efficacy expectations and outcome expectations are independent determinants of behavior, and theorists disagree about their relative importance.

Conceptual Model

Interactive processes involving the recovering individual and partner are thought to influence the meaning of surgery and attitudes and beliefs about recovery. Psychological characteristics of the recovering individual and partner (i.e., dispositional optimism and efficacy expectations) affect how these cognitions are translated into behavior. In selecting interactional role theory as a framework for the study of convalescence after cardiac surgery, two assumptions are made: (a) that the process of recovery is not solely biologically determined and (b) that the behavior of individuals (both recovering individuals and partners) influences the outcome of convalescence.

The conceptual model for this study is depicted in Figure 1. The model predicts that characteristics of the recovering individual, the partner, and the dyad, together with contextual factors in convalescence, influence the achievement of the convalescent-phase outcomes by the recovering individual and partner. Characteristics of the recovering individual affect his or her convalescent-phase outcomes both directly and indirectly, while characteristics of the partner affect convalescent-phase outcomes for the partner directly and indirectly. The interaction of individual, partner, and dyad characteristics creates the contextual factors in convalescence that influence also the achievement of convalescent-phase outcomes for both the recovering individual and partner. In addition, partner outcomes are influenced by the recovering individual's outcomes.

Recovering individual characteristics of interest in this study include age, gender, illness severity, and dispositional optimism. Dispositional optimism was shown to be important in younger males who had cardiac surgery. The relationships of age, gender, and illness severity to recovery are unclear and may have implications for targeting nursing interventions.

Because the contribution of partner characteristics to recovery after cardiac surgery has rarely been studied directly, the partner characteristics selected for this study include those shown to be associated with caregiver strain and caregiver's emotional distress in studies of family caregiving with physically frail or cognitively impaired elderly care recipients. Older age, female gender, and impaired health of the caregiver have been associated with more strain in the caregiving role (Given, Stommel, Collins, King, & Given, 1990; Horowitz, 1985). Partner optimism is thought to influence outcome and efficacy expectations.

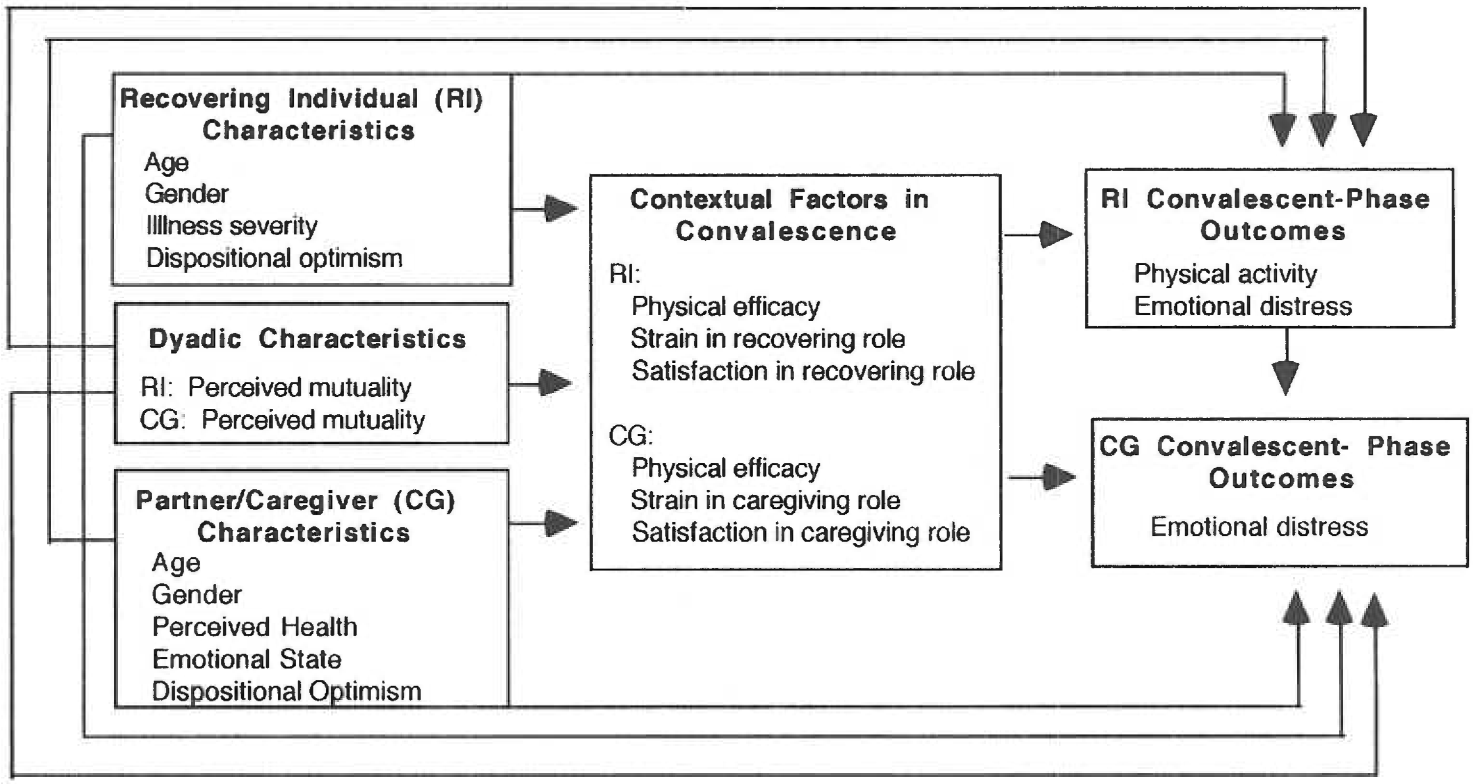

Figure 1. **Relationships of preexisting characteristics and contextual factors in convalescence to convalescent-phase outcomes after cardiac surgery.**

interactionist role theory suggests that the partner's outcome expectations would influence those of the recovering individual. In addition, both efficacy and outcome expectations are thought to affect contextual factors in convalescence and convalescent-phase outcomes.

Dyad characteristics include perceived mutuality from the perspective of the recovering individual and partner. Mutuality refers to the perceived positive quality of the relationship between the recovering individual and the partner (Archbold, Stewart, Greenlick, & Harvath, 1990). Mutuality has not been examined previously in studies of recovery from cardiac surgery. In studies of family caregivers of physically frail or cognitively impaired older adults, higher levels of mutuality were associated with lower levels of caregiver strain and enabled caregiving to continue despite objectively difficult situations (Archbold et al., 1990; Hirschfeld, 1983).

Contextual factors believed to influence convalescence include strain and satisfaction in the recovering and caregiving roles and the physical efficacy expectations of the recovering individual and partner. Within the recovering role, strain may relate to physical and emotional symptoms, repeat hospitalization due to cardiac disease or the effects of surgery, attempts at behavioral risk modification, and changes in other roles made necessary by the demands of recovery. Strain in the caregiving role may relate to worry about the meaning of symptoms, symptoms directly as they affect the caregiver, attempts at behavioral risk modification, and changes in other roles made necessary by the demands of caregiving.

General areas of satisfaction within the recovering role include satisfaction with progress in recovery, satisfaction with one's own role enactment, and satisfaction with the partner's role enactment. Similarly, satisfaction within the caregiving role includes satisfaction with progress in recovery, one's own role enactment, and the recovering individual's role enactment. In Archbold and Stewart's work with family caregivers, although rewards and strain were inversely associated, high levels of caregiver strain and high rewards of caregiving could coexist (Archbold, personal communication, 1992).

Physical efficacy refers to the perceived ability of the recovering individual to perform physical activities. Physical efficacy may influence goal setting and actions taken to promote activity. The interaction of the recovering individual and the partner may place constraints on the recovering individual's behavior or may assist him or her to behave optimally. Whether behaviors are constrained or supported will be determined partly by how efficacious the partner perceives the recovering individual to be (Bandura, 1986).

Convalescent-phase outcomes include the physical activity status and emotional distress of the recovering individual and the emotional distress of the partner. These outcomes were selected because they have been previously studied with younger patients, are known to vary over the course of recovery, and reflect the interaction of physiological and psychological function. The use of outcome variables that have been used by other investigators enhances the construct validity of the design. The use of these outcomes in both younger subjects and the current sample of older adults will facilitate contrasts between the two age groups. The kinds of strain associated with caregiving during convalescence (e.g., physical demands, worry, sleep disturbance) were predicted to influence the emotional state of the caregiver. Caregiver depression is a commonly used outcome in caregiving research (Schulz, Visintainer, &

Williamson, 1990) and emotional disturbance of the partner has been demonstrated after myocardial infarction (Mayou et al., 1978) and cardiac surgery (Rankin & Monahan, 1991).

Purpose, Aims, and Hypotheses

The overall purpose of this study is to examine the role of selected individual and dyadic variables in convalescence after cardiac surgery in people 65 years of age and older. Two major aims and related hypotheses guide the study:

Aim 1. To examine the relative importance of recovering individual characteristics, partner characteristics, dyad characteristics, and contextual factors in convalescence in explaining convalescent-phase outcomes for the recovering individual;

Aim 2. To examine the relative importance of recovering individual characteristics, partner characteristics, dyad characteristics, contextual factors in convalescence, and convalescent-phase outcomes achieved by the recovering individual in explaining convalescent-phase outcomes for the partner.

The primary hypotheses related to Aim 1 are that four sets of variables (characteristics of the individual, partner, and dyad and contextual factors in convalescence) will each contribute significantly to the explained variance in the physical activity and emotional distress of the recovering individual 3 months after cardiac surgery. Secondary hypotheses related to Aim 1 specify the direction of predicted relationships among individual characteristics of the recovering individual, partner, and dyad, and their relationship to contextual factors in convalescence and convalescent phase outcomes of the recovering individual. The specific aims and primary and secondary hypotheses are summarized in Table 1.

The primary hypothesis related to Aim 2 is that five sets of variables (characteristics of the recovering individual, partner, and dyad, contextual factors in convalescence, and the recovering individual's convalescent-phase outcomes) will each contribute significantly to the explained variance in the emotional distress of the partner at 3 months. Secondary hypotheses related to Aim 2 specify the direction of predicted relationships among individual characteristics of the partner, recovering individual, and dyad and their relationship to contextual factors in convalescence, and the convalescent-phase outcomes of the partner (Table 1).

Table 1

Summary of Aims and Hypotheses

Specific Aim:	Primary Hypothesis	Secondary Hypotheses
Aim 1: To examine the relative importance of recovering individual characteristics, partner characteristics, and dyadic characteristics and contextual factors in recovery in explaining convalescent phase outcomes for the recovering individual.	1. Four sets of variables--characteristics of the individual, partner and dyad, and contextual factors in recovery--will each contribute significantly to the explained variance in the physical activity and emotional state of the recovering individual.	1a. After controlling for illness severity, age of the recovering individual will be inversely associated with physical activity and emotional disturbance. 1b. Dispositional optimism will be positively associated with physical self-efficacy, with satisfaction in the recovery role, and with physical activity at 3 months. 1c. Dispositional optimism will be inversely associated with strain in the recovery role and with emotional disturbance at 3 months. 1d. For the recovering individual, more mutuality will be associated with less strain and more satisfaction in the recovery role and with less emotional disturbance at 3 months. 1e. For the recovering individual, the partner's dispositional optimism will be associated with less strain and more satisfaction in the recovery role. 1f. For the recovering individual, partner's dispositional optimism will be associated with more physical activity and less emotional disturbance at 3 months. 1g. More strain in the recovery role will be associated with less physical activity and more emotional disturbance at 3 months. 1h. For the recovering individual, more caregiver strain will be associated with less physical activity and more emotional disturbance at 3 months. 1i. More satisfaction in the recovery role will be associated with more physical activity and less emotional disturbance at 3 months. 1j. More satisfaction in the caregiver role will be associated with more physical activity and less emotional disturbance of the recovering individual at 3 months. 1k. For the recovering individual, physical self-efficacy will be positively associated with physical activity at 3 months. 1l. Partner's physical efficacy projections will be positively associated with physical activity of the recovering individual at 3 months. *(Table continues)*

Table 1

Summary of Aims and Hypotheses

Specific Aim:	Primary Hypothesis	Secondary Hypotheses
Aim 2: To examine the relative importance of the partner characteristics, recovering individual characteristics, dyadic characteristics, contextual factors, and RI convalescent phase outcomes in explaining convalescent phase outcomes for the partner.	2. Five sets of variables--characteristics of the partner, recovering individual and dyad, contextual factors in recovery, and recovering individual convalescent phase outcomes--will each contribute significantly to the explained variance in the emotional state of the partner.	2a. For the partner, more mutuality will be associated with less strain and more satisfaction in the caregiver role and with less emotional disturbance at 3 months. 2b. Older age, poorer physical health, more emotional disturbance, and female gender will be associated with more strain in the caregiver role. 2c. Dispositional optimism will be associated with higher physical efficacy projections and with more satisfaction and less strain in the caregiver role. 2d. Dispositional optimism will be inversely associated with emotional disturbance at 3 months. 2e. More satisfaction in the recovery role will be associated with less emotional disturbance for the partner at 3 months. 2f. More caregiver satisfaction will be associated with less emotional disturbance at 3 months. 2g. Partner's emotional state at 3 months will be positively associated with the emotional state of the recovering individual at 3 months.

CHAPTER 3

Method

Design

In order to examine the experience of older recovering individual/partner dyads during convalescence after cardiac surgery and the relative contribution of each member of the dyad to that experience, a sample of postoperative cardiac surgical patients and their partners was queried using structured interviews and questionnaires at the time of hospital discharge and a mailed survey 3 months after surgery. The hospital record was also reviewed before hospital discharge. Data on the surgical and hospital experience, as well as characteristics of the recovering individual, partner and dyad were collected to determine whether these were related to the strain and satisfaction experienced during convalescence and to the achievement of convalescent-phase outcomes.

A nonexperimental, longitudinal, correlational design was selected because (a) the basic question does not lend itself to experimental inquiry as the investigator does not have control of the independent variables and (b) recovery is a process expected to evolve across time. Although causality can not be inferred from this design, inferences about relations among the variables can be made from their covariation (Cook & Campbell, 1979).

Protection of Human Subjects

Approval for this study was obtained from the human subjects review committees of the Oregon Health Sciences University in Portland, the University of Washington in Seattle, and Providence Medical Center in Seattle. The study was judged to be exempt from further review by the Virginia Mason Medical Center in Seattle due to its approval by the Oregon Health Sciences University.

The study was described to prospective subjects by the investigator, all questions were answered, and written consent to participate was obtained from both the recovering individual and partner. The risk of psychological discomfort related to the disclosure of painful aspects of the recovery situation was identified as a potential risk of moderate seriousness but low probability. Four male patients became tearful during the discharge interview, in each case during administration of the mutuality scale (described below). Inquiry by the investigator revealed that the patients desired to continue; no patient chose to discontinue participation or reschedule the interview. A question was included on the 3-month surveys to determine if the questions had been emotionally upsetting. The majority of recovering individuals and partners indicated that the questions were "not at all" upsetting, five recovering individuals and two partners indicated that the questions were "a little" upsetting, and three partners indicated that the questions had been "somewhat" upsetting.

Fatigue associated with the interview was identified as a potential risk of low seriousness and moderate probability. In three interviews, the investigator perceived that the patient might be tiring and offered to interrupt and reschedule the remainder of the interview. No patient accepted this offer; however, in one case, the investigator decided to interrupt as the patient's fatigue appeared to be affecting the quality of the data.

Setting and Sample

Initially, subjects were recruited from the University of Washington Medical Center and Virginia Mason Medical Center; due to the slower than predicted rate of subject recruitment a third site, Providence Medical Center, was added. Thus, subjects were recruited from the cardiac surgery services of three teaching hospitals in Seattle, Washington. Surgeons at each of the two larger centers (University of Washington and Providence Medical Centers) perform approximately 1,000 open heart surgical procedures annually and surgeons at the smaller center perform approximately 250. Approximately half of the procedures at each site involve patients age 65 years or older, and approximately 20 to 25% of the procedures in all age groups are performed on women.

Sample Recruitment

Prospective subjects were initially identified by the cardiac surgery scheduling coordinator at each site. Recruitment procedures at the two larger centers were quite similar and will be discussed together. At these sites, the investigator telephoned the coordinator an average of three times per week to obtain the names of patients age 65 years and older who were scheduled for cardiac surgery. Scheduled patients were visited by the investigator on the evening before surgery or at the time of the preoperative clinic visit for those planning same-day admission and surgery. Willingness of prospective subjects to meet with the investigator was ascertained by the unit nurse or the clinic assistant. The investigator met with those who agreed, described the study in detail, answered questions, and either obtained formal consent to participate in the study or permission for the investigator to return after surgery. If the patient indicated a preference to wait until after surgery to consider the study, if the partner was not present preoperatively, or if the patient was missed preoperatively by the investigator, he or she was contacted postoperatively on the telemetry unit and given the opportunity to participate. Approval of the nurse caring for the patient was obtained before postoperative patients were approached by the investigator. In all participating cases, formal consent was obtained. The signed consent form was retained by the investigator and an unsigned copy was provided to the patient or partner. The consent forms for each of the three centers and the fact sheet are reproduced in Appendix B.

After about 4 months of subject recruitment, the fact that prospective subjects who had emergency surgery were not being identified was recognized. The investigator subsequently reviewed the patient board on the telemetry unit an average of two to three times per week, identified postoperative patients admitted by one of the cardiac surgeons, and checked the addressograph file or admission sheet to ascertain the patient's age. When patients were identified by this method, the nurse caring for the patient sought permission from the patient for the investigator to present the study. The nurse and patient determined if and when it would be convenient for the patient to talk with the investigator. At the designated time, the investigator provided a detailed description of the study, answered questions, and requested formal consent to participate. An effort was made to include the partner in the meeting with the postoperative patient; however nine partners were unavailable. Of these, two were contacted by phone and agreed to participate. For the remaining seven, assurance was provided by the patients that their partners were willing to participate. If the partner was not present at the time consent to participate was obtained, a second copy of the consent form, the discharge survey, and a stamped, self-addressed envelope was left with the patient to give to the partner.

At the smaller center, the investigator telephoned the coordinator two or three times each week and received the names and clinic appointment times of patients age 65 or older who were known to have a partner and were scheduled for cardiac surgery. The investigator met with the patient and partner in a conference room located in the suite of surgeon's offices. The study was described in detail, questions answered, and consent to participate obtained. The signed consent form was retained by the investigator, an unsigned copy was provided to the patient or partner, and a fact sheet describing the study and the dyad's intent to participate was placed in the patient's record. No mechanism was set up at this site to identify people having emergency surgery. On two occasions, the investigator was notified by the scheduling coordinator of an in-patient who was scheduled for surgery. These patients were seen on the hospital unit after obtaining approval from the nurse caring for the patient. On four occasions, the investigator was unable to be present at the time of the scheduled clinic visit. Two of these patients were seen postoperatively on the telemetry unit and two were missed by the investigator.

Sample Criteria

Recovering individuals were included if they met the following criteria: age 65 years or older; having cardiac surgery (i.e., revascularization, valve, or combined procedures with or without placement of defibrillator); cognitively intact, able to read English and to respond in writing to questionnaires; and willing to participate. In addition, patients had to have a partner (e.g., spouse, cohabiting, or common law) who was willing to participate, cognitively intact, able to read English, and able to respond in writing to questionnaires. The dyad was excluded if the patient experienced a stroke in the perioperative period or was discharged to an extended care facility. Liberal sampling criteria were used to obtain a sample representative of older adults presently experiencing cardiac surgery. Therefore, the sample criteria did not exclude people who had previously had cardiac surgery or those with coexisting chronic illnesses. The selection of a lower age limit of 65 years and the inclusion of subjects undergoing valve repair or replacement was intended to increase the number of female patients and male partners.

Sample Size

A systematic sample of 122 dyads entered the study and 107 dyads completed both phases of data collection. Sample size was determined through a power analysis using a significance level of .05 and a power level of .80. Twenty studies were reviewed that examined relationships similar to those planned for this study. A range of effect size was determined and, together with clinical judgment, guided the predicted effect size. Additional detail about the power analysis is summarized in Table 2. The estimated proportion of variance accounted for by each set of predictors (i.e., individual characteristics, partner characteristics, dyad characteristics, and contextual factors in convalescence) at each sequential step of the planned hierarchical multiple regression analysis ranged from .01 to .25. The power analysis indicated that a sample of 115 would be adequate in all but one contingency. Sample size was inflated to 122 dyads to accommodate possible attrition, which was not expected to exceed 6% between hospital discharge and the 3-month data collection time (Archbold et al., 1990). As mentioned above, a third site was added to achieve the planned number of subjects; in addition, the subject recruitment period was extended from a planned 6 months to an actual 11 months.

Of 339 prospective subjects identified by the scheduling coordinators, 287 were screened by the investigator. Of these, 162 (56%) were eligible to participate. The most frequent reason for ineligibility was the absence of a partner. Of those eligible, 122 (75%) patients and their partners agreed to

Table 2

Effect Sizes Used in Power Analysis

Sets of predictors in hierarchical regression	Estimated increment in R^2	Estimated sample size
Predictors of 3 month activity: 1. Individual characteristics with 3 month activity	$R^2 = .12$	$n = 93$
2. Dyadic characteristics with 3 month activity	$R^2 = .01$ (a) $R^2 = .10$ (b)	$n = 77$ $n = 63$
3. Partner characteristics with 3 month activity	$R^2 = .10$	If a, then $n = 111$ If b, then $n = 98$
4. Contextual factors with 3 month activity	$R^2 = .10$	If a, then $n = 110$ If b, then $n = 98$
Predictors of RI emotional state: 1. Individual characteristics with RI emotional state at 3 months	$R^2 = .01$ (c) $R^2 = .10$ (d)	If c, then $n = 1199$ If d, then $n = 114$
2. Dyadic characteristics with RI emotional state at 3 months	$R^2 = .09$ (e) $R^2 = .25$ (f)	If c and e, then $n = 115$; If c and f, then $n = 36$; If d and e, then $n = 94$; If d and f, then $n = 32$.
3. Partner characteristics with RI emotional state at 3 months	$R^2 = .15$	If c and e, then $n = 77$; If c and f, then $n = 62$; If d and e, then $n = 69$; If d and f, then $n = 55$.
4. Contextual factors with RI emotional state at 3 months	$R^2 = .10$	If c and e, then $n = 107$; If c and f, then $n = 85$; If d and e, then $n = 95$; If d and f, then $n = 73$.
Predictors of partner's emotional state: 1. Individual characteristics with partner emotional state at 3 months	$R^2 = .12$	$n = 93$
2. Dyadic characteristics with partner emotional state at 3 months	$R^2 = .10$	$n = 92$
3 Partner characteristics with partner emotional state at 3 months	$R^2 = .10$	$n = 100$
4. Contextual factors to partner emotional state at 3 months	$R^2 = .15$	$n = 78$

Note: When no estimate of R^2 was available from the literature, a small ($R^2 = .01$) and moderate ($R^2 = .10$) estimate of effect size were used. RI = Recovering individuals.

participate, resulting in a refusal rate of 25%. Prospective subjects who refused often did so in the initial screening by the nurse or clinic assistant. General comments related to nonparticipation included the following: "I'm too sick", "I just don't want to bother with anything else right now", and "My husband/wife would never agree to that." The refusal rate for female patients and male partners was slightly higher (29%) than the refusal rate for male patients and female partners (23%) although the difference was not statistically significant ($z = 0.76$, $p = .44$).

Sample Characteristics

The study sample consisted of 86 male (80%) patients and their female partners and 21 female (20%) patients and their male partners. All but four of the dyads were married, with more than half (68%) married for over 40 years. Patient age ranged from 63 to 82 years with a mean of 71.4 years ($SD = 4.1$ years). Two subjects, one male and one female, 63 years of age had been identified by the scheduling coordinator as potential subjects, had been contacted by the investigator, and had agreed to participate before it was discovered that their age was less than 65 years; therefore, they were retained in the study. Partner age ranged from 49 to 84 years with a mean of 69.6 years ($SD = 6.9$ years). As expected, the majority of patients (85%) and their partners (84%) were retired. The sample was well educated, as 92% of patients and partners had at least a high school education. Table 3 summarizes the social status characteristics of patients and partners.

Duration of heart disease, as reported by the patient, ranged from being diagnosed on this admission (10%) to having been diagnosed more than 10 years ago (33%). Primary cardiac conditions included coronary heart disease (72%), valvular heart disease (21%), and combined coronary and valvular heart

Table 3

Social Status Characteristics of the Study Sample, (N = 107)

Variable	Patient Frequency	Patient (%)	Partner Frequency	Partner (%)
Gender				
Female	21	(19.6)	86	(80.4)
Male	86	(80.4)	21	(19.6)
Race				
Asian or Pacific Islander			1	(0.9)
Hispanic	1	(0.9)		
Native American			1	(0.9)
White	106	(99.1)	101	(96.3)
Other			2	(1.9)
Education[a]				
<7th grade	2	(1.9)	1	(0.9)
7th through 9th grade	4	(3.7)	5	(4.7)
10th or 11th grade	2	(1.9)	3	(2.8)
High school graduate	27	(25.2)	36	(33.6)
Some college[b]	39	(36.4)	38	(35.5)
College graduate	24	(22.4)	17	(15.9)
Graduate degree	9	(8.4)	7	(6.5)
Work Status				
Retired	91	(85.0)	90	(84.1)
Semi-retired	12	(11.3)	7	(6.5)
Working	4	(3.7)	10	(9.3)
Occupation[a]				
Executives & Major Professionals	17	(15.9)	7	(6.5)
Administrators & Lesser Professionals	11	(10.3)	13	(12.1)
Minor Professionals	19	(17.8)	13	(12.1)
Technicians	13	(12.1)	17	(15.9)
Clerical & Sales	6	(5.6)	16	(15.0)
Craftsmen	20	(18.7)	6	(5.6)
Machine operators	10	(9.3)	2	(1.9)
Unskilled workers	3	(2.8)	8	(7.5)
Menial work	7	(6.5)	1	(0.9)
Homemaker			21	(19.6)

[a]Categories based on Four Factor Index of Social Status (Hollingshead, 1975). [b]Includes specialized training such as business or secretarial school.

disease (8%). Twenty patients (19%) had previous cardiac surgery, 60 (56%) had previous myocardial infarction, and 15 patients (14%) had a diagnosis of congestive heart failure. Emergent surgery, defined as hospital admission to the intensive care unit or directly to the operating room, occurred in 21% of the sample. Only five partners (5%) had experienced cardiac surgery themselves. Patient disease characteristics are summarized in Table 4.

Instruments

Five previously tested instruments were used to measure characteristics of the recovering individual, the partner, the dyad, and the outcome variables of both the recovering individual and the partner. Three modified instruments were used to measure contextual factors in convalescence. These instruments, together with several single item social status questions and four open-ended questions, were combined in one interview schedule and three surveys. The medical record was reviewed for sociodemographic and illness-related data. The data collection tools are reproduced in Appendix C.

Individual, Partner and Dyad Characteristics

Cognitive impairment. The Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) was used to screen partners for the presence of cognitive impairment and to assess the cognitive status of the recovering individual at the time of hospital discharge. This 10-item questionnaire includes items such as "What is the date today (month/day/year)?" and "Who is the current president of the United States?" The number of incorrect items is totaled and interpreted as follows: 0 to 2 errors, intact functioning; 3 to 4 errors, mild intellectual impairment; 5 to 7 errors, moderate intellectual impairment; and 8 to 10 errors, severe intellectual impairment. This instrument is

Table 4

Disease Characteristics of the Study Sample, (N = 107)

Variable	Frequency	(%)
Primary Illness		
Coronary Heart Disease	77	(72.0)
Valvular Heart Disease	22	(20.6)
Mixed Coronary & Valvular Heart Disease	8	(7.5)
NYHA Functional Class		
Class I	5	(4.7)
Class II	35	(32.7)
Class III	15	(14.0)
Class IV	17	(15.9)
Not recorded	35	(32.7)
Left Ventricular Ejection Fraction		
> 55%	46	(43.0)
40 to 55%	15	(14.0)
25 to 39%	12	(11.2)
< 25%	1	(0.9)
Missing or not recorded	21	(19.6)
Surgical Procedure		
Aortic valve repair or replacement	10	(9.3)
Coronary artery bypass surgery (CABS)	74	(69.2)
Mitral valve repair or replacement	8	(7.5)
CABS plus valve	11	(10.3)
Double or triple valve repair & replacement	4	(3.7)
Re-do surgery (all types)*	20	(18.7)
Coexisting Illnesses[a]		
Previous myocardial infarction	60	(56.1)
Congestive heart failure	15	(14.0)
Peripheral vascular disease	15	(14.0)
Cerebrovascular disease	18	(16.8)
Chronic obstructive lung disease	11	(10.3)
Ulcer	6	(5.6)
Diabetes mellitus	24	(22.4)
Renal insufficiency (creatinine > 3)	2	(1.9)
Blood dyscrasias	3	(2.8)
Any solid tumor in past 5 years	8	(7.5)

[a]Percent of total sample, sum > 100%.

more difficult than other screening measures of cognitive function because the subject must answer the question entirely correctly to score a point (e.g., date in month, day, and year). Norms for the scale have been established and scores are adjusted for educational level, allowing one additional error if the subject has only a grade-school education and one less error if the subject has education beyond high school. One additional error is also allowed for blacks, regardless of educational level. The SPMSQ has correlated significantly with a clinical diagnosis of organic brain syndrome (Pfeiffer, 1978), with the longer Mental Status Questionnaire (Fillenbaum, 1980), and with the results of psychiatric interviews (Fillenbaum, 1980). Test-retest reliability was reported as ranging from .80 to .83 (Pfeiffer, 1975). This measure of cognitive impairment was selected because it is brief, easy to administer, and was reportedly inoffensive when administered to a community-based sample of older adults (Kane & Kane, 1981).

In screening, only one prospective dyad was eliminated due to moderate intellectual impairment of the partner. At the time of hospital discharge, the large majority of patients (96%) demonstrated intact intellectual functioning; two patients demonstrated mild and one moderate intellectual impairment. Dyads were not excluded based on patient scores.

Sociodemographic variables. Age, gender, and ethnicity of the recovering individual were obtained through direct observation and chart review. In retrospect, the accuracy and specificity of observation in assessing ethnic group membership is inadequate. Work status (i.e., working, retired, or semiretired), occupation or preretirement occupation, and educational level were obtained by self-report and categorized according to the Hollingshead classification. Age, gender, and ethnicity of the partner were obtained by self-report.

A single item asked the partner to rate his or her own health in comparison with others of the same age. This item has been used frequently in studies of older people, such as the National Long Term Care Survey (Stone, Cafferata, & Sangl, 1987), and single-item indicators of perceived health have been shown to correlate highly with physician ratings of health (LaRue, Bank, Jarvik, & Hetland, 1979). In this study, 89% of the partners rated their health as good or excellent.

Illness severity. Illness severity was conceptualized as having three components: preoperative activity status, measured by the Duke Activity Status Index (DASI); severity of heart disease, measured by NYHA functional class; and the number of coexisting chronic illnesses weighted according to relative risk for mortality (Charlson, Pompei, Ales, & MacKenzie, 1986). The DASI consists of a list of 12 activities reflecting personal care, ambulation, household tasks, sexual function and activities. Subjects are asked to indicate those activities that can be performed. The DASI is described in greater detail in the section describing convalescent-phase outcome measures. The NYHA functional classification and the comorbidity index are described below. Scores on the three measures were standardized by finding the difference between the value and the mean of the distribution and dividing this difference by the standard deviation (*z*-scores). After reverse coding of preoperative activity, the z-scores were summed to yield an index of illness severity. The possible range of illness severity scores is approximately -9.0 to +9.0. Cronbach's coefficient alpha for the three scores in the illness severity index was .51 with an average inter-item correlation of .26. Because the internal consistency of a measure is a function of average inter-item correlation and number of items, the low coefficient alpha was assumed to be due to the small number of items and the score was retained for subsequent analyses. Table 5 summarizes the psychometric characteristics of scale variables used in this study.

New York Heart Association Functional Class. The NYHA Functional Classification is a commonly used indicator of cardiac disease severity (New York Heart Association Criteria Committee, 1964). It consists of four functional classes: Class I, with coronary heart disease but without resulting limitation of physical activity; Class II, coronary heart disease resulting in slight limitation of physical activity; Class III, coronary heart disease resulting in marked limitation of physical activity; and Class IV, coronary heart disease resulting in inability to engage in physical activity.

Despite extensive clinical and research use of the NYHA functional classification, inter-rater reliability between two physicians was quite low (56%) in a sample of cardiac patients referred for exercise testing (Goldman, Hashimoto, Cook, & Loscalzo, 1981). In the same sample, the assigned NYHA class agreed with exercise treadmill performance only 51% of the time (Goldman et al., 1981). In the current study, the NYHA functional class was missing from the medical record of 30% of the patients; missing data on the functional classification were not limited to subjects with valvular heart disease.

Charlson Comorbidity Index. The Charlson Comorbidity Index (CCI) is a weighted index reflecting the number and seriousness of coexisting conditions (Charlson et al., 1986). Weights for each condition were initially determined based on their adjusted relative risk of mortality in a cohort of 559 medical patients. A total of 19 different conditions are weighted as 1, 2, 3, or 6

Table 5

Psychometric Statistics for Scale Variables

Scale	Number of Response Options	Number of Items	Average Inter-Item Correlation	Cronbach's Alpha (n)[a]
Illness Severity Index	—	3	.261	.51 (71)
Duke Activity Status Index (DASI)				
Preoperative Activity, T1	2	12	.155	.69 (104)
Postoperative Activity, T2	2	12	.145	.65 (99)
POMS Total Mood Disturbance				
Recovering Individual, T2	4	58	.241	.94 (91)
Partner, T2	4	58	.294	.96 (82)
Mutuality Scale				
Recovering Individual, T1	5	14	.386	.89 (102)
Partner, T1	5	15	.473	.93 (103)
Life Orientation Test (LOT)				
Recovering Individual, T1	5	8	.228	.70 (104)
Recovering Individual, T2	5	8	.258	.73 (102)
Partner, T1	5	8	.299	.78 (96)
Partner, T2	5	8	.413	.85 (99)
POMS-LASA Total Mood Disturbance				
Recovering Individual, T1	100	6	.206	.60 (106)
Recovering Individual, T2	100	6	.382	.77 (104)
Partner, T1	100	6	.322	.75 (96)
Partner, T2	100	6	.359	.76 (103)
Physical Efficacy				
Recovering Individual, T1	10	15	.354	.88 (102)
Partner, T1	10	15	.381	.88 (96)
Strain in Convalescence				
Recovery Demands, T2	2	34	.074	.76 (93)
Recovery Difficulty, T2	5	35	.148	.86 (64)
Caregiving Demands, T2	2	32	.143	.85 (86)
Caregiving Difficulty, T2	5	33	.220	.90 (60)
Satisfaction in Convalescence				
Recovering Individual, T2	5	12	.372	.85 (102)
Partner, T2	5	12	.521	.93 (103)

Note: T1 = measured prior to hospital discharge. T2 = measured 3 months after surgery.
[a]Cronbach's alpha computed only for those cases having valid (i.e., nonmissing) responses to all items on the scale.

based on their relative risk. Weighted scores are summed to produce a single score with a possible range of 0 to 37. The CCI was selected because it takes account of both the number of coexisting conditions and their severity. It has been used to predict length of hospital stay in patients after cardiac surgery (Jollis et al., 1991).

Dispositional optimism. Dispositional optimism of the recovering individual and partner was measured using the Life Orientation Test (LOT) (Scheier & Carver, 1987). This scale consists of eight coded items, four phrased in a positive and four in a negative way, plus four filler items. Sample items are as follows: "In uncertain times, I usually expect the best" and "If something can go wrong for me, it will." Subjects are asked to indicate their level of agreement with the statement on the following 5-point scale: 0, strongly disagree; 1, disagree; 2, neutral; 3, agree; and 4, strongly agree. For scoring, the filler items are omitted, negatively phrased items are reverse scored, and all the coded items are summed. The range of possible optimism scores is 0 to 32.

The LOT was developed with college students and demonstrated acceptable internal consistency (Cronbach's alpha = .76) and stability (test-retest reliability = .79 over 4 weeks) in that population. In a sample of 92 mentally alert older volunteers from a retirement community (*M* = 84 years, range 69-100 years), LOT scores correlated in the expected direction with measures of internal and external locus of control (Guarnera & Williams, 1987). Further evidence of construct validity was found in a study of 158 patients (mean age = 52.7 years, *SD* = 8.1 years) recovering after a myocardial infarction (Desharnais, Godin, Jobin, Valois, & Ross, 1990). Subjects scoring above the median on the LOT scored significantly lower on perceived susceptibility of having another infarction

($p < .05$), perceived severity of another infarction ($p < .05$), and experienced fear of having another infarction ($p < .001$) than did those scoring below the median.

Dispositional optimism is described by Scheier and colleagues as a relatively stable personality trait (Scheier & Carver, 1985). To assess the stability of the measure in this sample, the LOT was administered to both the recovering individual and the partner at the time of discharge and again 3 months after surgery. Scores were highly correlated between administration times for both the recovering individual ($r = .62$, $p < .001$, $n = 104$) and the partner ($r = .67$, $p < .001$, $n = 100$). Internal consistency reliability of the LOT ranged from .70 to .85 with average inter-item correlation coefficients of .22 to .42.

Perceived mutuality. Perceived mutuality in the relationship was measured from the perspectives of both the recovering individual and the partner using the Mutuality Scale (Archbold et al., 1990). This 15-item scale was developed with community-based, older family caregivers and care receivers. Sample items are as follows: "To what extent do the two of you see eye to eye?" and "How much do you laugh together?" Although the Mutuality Scale contains four subscales (i.e., affective closeness, reciprocity, shared pleasurable activities, and shared values) only the total mutuality score was used. The revised version of the Mutuality Scale used in this study has the following 5-point response scale: 0, not at all; 1, a little; 2, some; 3, quite a bit; and 4, a great deal. Scores on the Mutuality Scale are computed by averaging responses, with possible scores ranging from 0.00 to 4.00.

Strong evidence for the content validity of this scale emerges from procedures used in its development. Items were developed from qualitative interviews with family or friend caregivers to impaired older persons and with care receivers. Items are imbedded in their experiences and, insofar as possible, questions and response options use the caregivers' and care receivers' own words (personal communication, P. G. Archbold, 1990). Evidence of both construct validity and reliability was demonstrated in a longitudinal study of 78 older caregiving dyads (Archbold et al., 1990). After controlling for gender, being a spouse, cognitive and functional impairment of the care receiver, as well as the amount of direct care provided, mutuality explained from 4 to 15% of the variance in aspects of caregiver role strain ($p < .05$). Internal consistency reliability of the Mutuality Scale was .91, and the correlation of 6-week scores with 9-month scores was .79 (Archbold et al., 1990).

Although the intent in this study was to use exactly the same format of the Mutuality Scale with both the recovering individual and partner, an error occurred such that one item, "How much do you enjoy sharing past experiences with him or her?," was omitted from the interview schedule used with the recovering individual. This error was discovered late in the data collection period and a decision was made not to add the item. Therefore, the mutuality score for the recovering individual was computed using 14 items and the mutuality score for the partner was computed using 15 items. Because the mean score is used in analysis, this error was not expected to significantly limit interpretation of the scores. Internal consistency reliability of the Mutuality Scale was .90 for recovering individuals and .93 for partners.

Emotional distress. The Profile of Mood States Linear Analog Self Assessment (POMS-LASA) (Sutherland, Lockwood, & Cunningham, 1989) was used to measure emotional distress of the recovering individual and partner at the time of hospital discharge. The POMS-LASA consists of six visual analog scales corresponding to the six subscales of the Profile of Mood States (POMS): tension/anxiety, depression/dejection, anger/hostility, confusion/bewilderment, fatigue/inertia, and vigor (Sutherland et al., 1989). Each of the visual analog scales consists of a 100 millimeter line that is anchored by "not at all" and "extremely". The POMS-LASA was developed for clinical use with cancer patients and for use in research settings where fatigue and loss of interest are predicted to reduce the reliability of longer measures. Scores are computed by measuring distance in millimeters from the low anchor to the subject's mark. A total mood disturbance score is obtained by negatively coding (multiplying by -1) the vigor subscale and summing all subscale scores. In a sample of 42 cancer patients, the total mood disturbance score of the POMS-LASA was highly correlated (Spearman r = .83) with the total mood disturbance score on the POMS. Similar patterns of relationships were observed between the POMS-LASA and the POMS when each was correlated with other measures of psychological symptoms (Sutherland et al., 1989).

In this study, the POMS-LASA was administered to both the recovering individual and partner at the time of hospital discharge and 3 months after surgery. Although the instrument seemed to work well with recovering individuals when administered by the investigator in the discharge interview, several partners (n = 5) were unable to complete the linear analog scales according to the written directions. The instructions written to accompany the POMS-LASA are contained within the partner discharge survey reproduced in Appendix C. Internal consistency reliability of the POMS-LASA over the four times ranged from .60 to .77 with an average inter-item correlation of .21 to .38. The lowest internal consistency coefficient was found for recovering individuals at the time of hospital discharge (Cronbach's alpha = .60). At 3 months, the POMS-LASA total mood disturbance score correlated highly with the POMS total mood disturbance score for recovering individuals ($r = .61$, $p < .01$, $n = 101$) and for partners ($r = .77$, $p < .01$, $n = 100$).

Contextual Factors in Convalescence

Published measures of the contextual factors in convalescence (physical efficacy expectations, strain and satisfaction in the recovering and caregiving roles) do not exist or were inappropriate for this study. Therefore existing measures of closely related concepts were modified and imbedded in the convalescent experience. Item content for the strain and satisfaction scales was generated from the clinical experience of the investigator, from qualitative interviews and preliminary work in two research methods courses taken by the investigator, and from existing measures of concepts related to caregiving (Archbold et al., 1990; Stewart, Archbold, & Harvath, 1990). The physical efficacy scales combined the activities of the DASI with a previously tested 10-point confidence scale (Taylor et al., 1985). Each of these modified scales are described in further detail below. Item level descriptive and psychometric statistics of modified scales are summarized in Appendix E.

Efforts to ensure content validity of the scales included the generation of a broad collection of items that were representative of the relevant content (Nunnally, 1978), deriving items from clinical practice and clinical research experiences, and subjecting items to review by experts. Question structure and response options were modeled on the work of Archbold and Stewart, which has accrued substantial evidence of content validity, construct validity, and reliability in their work with family caregivers.

The modified measures were subjected to an initial review by a panel of 16 experts in gerontological nursing. Based on this review, the measures were modified and subjected to a second expert panel consisting of two experienced gerontological researchers, one of whom is a psychometrician, two experts in cardiovascular nursing, and seven older-adult lay reviewers. Of the lay reviewers, one dyad had recently experienced cardiac surgery and another had recently experienced neurosurgery. All of the lay reviewers were well-educated volunteers. They were asked to examine the surveys for clarity of the questions and instructions, to identify possible offensiveness, and to estimate the time required to complete the survey; comments and suggestions were encouraged. In general, the lay reviewers found the questions to be clear and inoffensive. They did not make specific recommendations for change. An incidental finding was that one reviewer changed his responses after discussion with his partner. Because of this, the instructions in the cover letter were modified to encourage each subject to complete the survey independently. The cover letter is reproduced in Appendix D.

Recommendations from the professional reviewers included suggestions for more parallel wording between items on the instruments used to measure strain and satisfaction of the recovering individual and partner, for using the same response options for the recovering individual discharge interview and the partner discharge survey, and for the sequencing of instruments within the interview schedule and surveys. These recommendations were incorporated into the final version of data collection instruments.

Construct validity of the modified measures was evaluated through the assessment of hypothesized relationships with more mature measures. Details of the hypothesized relationships and the performance of the measures is summarized in Table 6. In general, all of the six predicted relationships for recovering individual measures were in the predicted direction and four were statistically significant ($p < .05$). Ten of the eleven predicted relationships for the partner were in the predicted direction and eight were statistically significant ($p < .05$).

Finally, two open-ended questions asked subjects to describe what was most difficult and most satisfying in convalescence. These data were subjected to content analysis to further assess content validity of the strain and satisfaction scales. Physical sequelae of surgery were the most frequently listed difficulties by both the recovering individuals and partners. Cognitive/emotional sequelae and role change were listed less frequently. Attempts at behavioral lifestyle change was listed as difficult by partners, but not by recovering individuals. The most frequently listed satisfier for both the recovering individual and the partner was progress in recovery. Satisfaction with the role enactment of the partner and the recovering individual was listed by both recovering individuals and partners. Thus the responses to open-ended questions provided additional support for the content validity of these scales. The content analysis is described in more detail in Chapter 4 and is summarized in Table 20.

Physical efficacy expectations. Physical efficacy of the recovering individual was assessed in the discharge interview using a scale consisting of 15 items. The scale combined the 10-point response option of a previously used efficacy scale (Taylor et al., 1985) and the activities contained in the DASI (Hlatky, et al., 1989). Three activity items were added to the DASI to make it more relevant to the immediate postoperative experience: the ability to eat a

Table 6

Correlation Coefficients for Construct Validity of New Scales

Hypothesized Relationships	*r*	*p*
1. Higher dispositional optimism will be associated with higher physical efficacy expectations for the recovering individual.	.06	.51
2. Recovering individual physical self- efficacy expectations will be associated positively with activity at 3 months.	.16	.11
3. More strain in the recovery role will be associated with lower physical activity at 3 months.	-.31 -.34	.01[a] <.001[b]
4. More strain in the recovery role will be associated with more emotional disturbance in the recovering individual at 3 months.	.45 .46	< .001[a] < .001[b]
5. Higher dispositional optimism will be associated with higher physical efficacy expectations for the partner.	-.01	.93
6. Higher mutuality will be associated with less strain in the caregiving role.	-.24 -.28	.03[a] .01[b]
7. Higher mutuality will be associated with more satisfaction in the caregiving role.	.31	.01
8. More satisfaction in the caregiving role will be associated with less emotional disturbance of the partner at 3 months.	-.25	.01
9. Lower emotional distress at discharge will be associated with lower strain in the caregiving role.	.30 .38	.01[a] < .001[b]
10. Better perceived health will be associated with lower strain in the caregiving role.	-.02 -.12	.81[a] .23[b]
11. Less strain in the caregiving role will be associated with less emotional disturbance of the partner at 3 months.	.45 .51	<.001[a] < .001[b]

[a]demands; [b]difficulty

meal someone had prepared, to get oneself up to the toilet, and to get oneself dressed. The metabolic cost of these activities is known and was used to weight each activity. Recovering individuals indicated their level of confidence in the ability to perform each activity at the time of hospital discharge. Each weighted activity was multiplied by the level of confidence and an average score was computed. The range of possible physical efficacy scores was 4.43 to 44.3. Internal consistency reliability of this scale was .88 (n = 102) with item-total correlation coefficients of .19 to .74 and a mean inter-item correlation of .35 (Table 5).

The partner's physical efficacy expectations were assessed in a similar manner. Phrasing of the items was modified to reflect the partner's expectation of the recovering individual's physical efficacy. The measure had a range of possible scores from 4.43 to 44.3. Internal consistency of this scale was .88 (n = 96), item-total correlation coefficients ranged from .23 to .70, with a mean inter-item correlation of .38.

Strain in the recovering and caregiving roles. Strain in the recovering role was assessed using a composite measure that asked if the recovering individual had the experience (demands) and, if so, how difficult the experience was (difficulty). A total of 34 demands were generated to tap the domains of strain from physical and emotional symptoms related to surgery, strain from efforts at lifestyle modification, and strain from changes in role repertoire. The role change items tapped six primary roles including partner/confidant, provider, housekeeper, parent/grandparent, sexual partner, and participant in recreational activities. Sample items from the recovering individual strain scale are as follows: "In the time since your surgery, did you have a change in your vision? If so, how difficult was that for you?; and "In the time since your surgery have you been exercising at least three times a week? If so, how difficult was that for you?" Difficulty was scored on a 6-point scale: 0, did not have the experience; 1, easy; 2, not too hard; 3, somewhat hard; 4, pretty hard; and 5, very hard. A single item asked "Overall, how hard was recovery for you?" and used the 1 to 5 response scale. A mean difficulty score was computed and possible scores ranged from 0.00 to 5.00. The range of possible scores for recovery demands was 0 to 34.

Internal consistency reliability for the recovery demands scale was .76 (n = 93) with an average inter-item correlation of .07. However, four items demonstrated a negative item-total correlation and six items demonstrated very low (≤.10) positive item-total correlation coefficients. (See Appendix E for item-level statistics.) Examination of the items did not reveal an explanation, so exploratory principal components factor analysis was performed. Twelve factors were extracted and explained 68% of the scale variance. However, the first factor contained seven items and explained only 5% of the total scale variance.

Internal consistency reliability for the recovery difficulty scale was .86 (n = 64), with an average inter-item correlation of .15. One item had a negative item-total correlation coefficient, one had a positive correlation coefficient of .10, and three items had standard deviations less than 0.8.

The measurement of strain in the caregiving role was done in a similar way. This scale consisted of 32 caregiving demands designed to tap strain from worry, strain from the recovering individual's symptoms (e.g., mood swings, irritability), strain from direct care, strain from attempts at lifestyle modification, and strain from changes in the role repertoire. Subjects were asked to indicate if they had the experience and, if so, how difficult it was for them. Sample items are as follows: "Has your partner been irritable or hard to get along with? If so, how difficult was that for you?"; and "Have you tried to exercise with your partner? If so, how difficult was that for you?" A single item asked "Overall, how difficult has the recovery period been for you?" Caregiving difficulty was measured on the same 6 point "did not have the experience" to "very hard" scale that was used to measure difficulty in recovery. The range of possible scores on the caregiving demands scale was 0 to 32, and on the caregiving difficulty scale was 0.00 to 5.00.

Internal consistency reliability for the caregiving demands scale was .85 (n = 86) with an average inter-item correlation of .14. Item-total correlation coefficients ranged from .09 to .59 and two were less than .10. Internal consistency reliability of the caregiving difficulty scale was .90 (n = 60) with an average inter-item correlation of .22. Item-total correlation coefficients ranged from .10 to .66. There were no negative item-total correlation coefficients and only one item had a standard deviation less than 0.8.

Satisfaction in the recovering and caregiving roles. Satisfaction in the recovering role was assessed using a 12-item scale that asked the recovering individual to indicate the overall level of satisfaction with experiences in the recovering role. The internal structure of this measure was designed to tap satisfaction with progress in recovery, the recovering individual's own role enactment, and the partner's role enactment. Sample items included the following: "Overall, how satisfied are you with your physical progress in recovery?"; and "Overall, how satisfied are you with your partner's willingness to help you?" The level of satisfaction was expressed on the following 5-point scale: 1, highly dissatisfied, 2, dissatisfied, 3, neutral, 4, satisfied; and 5, highly satisfied. Score on individual items were averaged, producing possible mean satisfaction scores of 1.00 to 5.00. The internal consistency reliability of the satisfaction in the recovering role scale was .85 (n = 102), and the average inter-item correlation was .37. No item was negatively correlated to the scale, but 9 of the 12 items had a standard deviation less than 0.8.

Satisfaction in the caregiving role was assessed similarly. Twelve items relating to satisfaction with progress in recovery, the recovering individual's role enactment, and the partner's own role enactment were used with the same 5-point "highly dissatisfied" to "highly satisfied" response option. Items were written to parallel items on the recovering individual satisfaction scale. Sample items included the following: "Overall, how satisfied are you with your partner's physical progress in recovery?"; and "Overall, how satisfied are you with your partner's willingness to let you help in recovery?" Mean satisfaction scores were computed, producing a possible range of 1.00 to 5.00. The internal consistency reliability of this scale was .93, average inter-item correlation was .52, no items had a negative item-total correlation, and no item had a standard deviation less than 0.8.

Convalescent Phase Outcomes

Physical activity. The DASI was used as the indicator of physical activity status (Hlatky et al., 1989). It consists of a list of 12 activities reflecting personal care, ambulation, household tasks, sexual function, and recreational activities. Subjects are asked to indicate those activities that can be performed. Each activity is weighted by its known metabolic cost and the weighted activities are summed to obtain a magnitude score. Possible scores range from 0 to 58.2.

Individual items on the DASI were initially selected from the Rand Corporation Physical Limitations Scale (Stewart, Ware, Brook, & Davies-Avery, 1978). In the validation phase of instrument development, scores on the DASI correlated well with total oxygen consumption (Spearman r = .58) in patients undergoing maximal exercise testing (Hlatky et al., 1989). Additional evidence of construct validity was found in a study of 438 patients who underwent cardiac catheterization prior to cardiac surgery (Nelson, et al., 1991). Median DASI score reflected the number of diseased coronary vessels. Patients with a history of myocardial infarction or congestive heart failure and those with a reduced left ventricular ejection fraction scored lower on the DASI than did patients with coronary heart disease without these characteristics. Data about the reliability of the DASI and its sensitivity to change have not been published.

The DASI was selected for this study because of its known relationship to physiological measures of oxygen consumption, and because it can be administered either as an interview or as a self-report questionnaire. The correlation of the DASI with peak oxygen uptake was higher when administered as an interview (Spearman r = .81) than when administered as a questionnaire (Spearman r = .58) (Hlatky et al., 1989). In the current study, it was used to measure both preoperative activity status and activity status 3 months after surgery, with internal consistency reliability coefficients of .69 and .65 respectively.

Emotional distress. The POMS was used as the outcome indicator of emotional distress (McNair, Lorr, & Droppleman, 1981). The POMS consists of a list of 65 adjective rating scales, which comprise six independent subscales: tension/anxiety, depression/dejection, anger/hostility, confusion/bewilderment, fatigue/inertia, and vigor. Subjects are asked to indicate how they have been feeling over a specified time frame on a 5-point scale: 0, not at all; 1, a little; 2, some; 3, quite a bit; and 4, extremely. A total mood disturbance score can be obtained by summation of the subscale scores, after negatively coding the vigor score.

The POMS is a widely used measure and considerable evidence for its construct and content validity in young and middle-aged people has been published (McNair et al., 1981). In a sample of 505 older adults (community dwelling, *n* =49; nursing home residents, *n* = 19; life care community residents, *n* = 99; and congregate living residents, *n* = 329), exploratory factor analysis yielded four factors (i.e., tension, depression, anger, and fatigue) that were comparable to the original structure and one (i.e., vigor) that was quite similar (Kaye et al., 1988). The structure of the confusion subscale was significantly different in this sample of older persons from that of the samples on whom the instrument was standardized. The authors conclude that the POMS was valid for use with minimally competent older adults, but that caution must be used in the interpretation of the confusion subscale. These investigators did not provide information about the psychometric characteristics of the total mood disturbance score.

The Total Mood Disturbance (TMD) score was used as an outcome measure for both the recovering individual and partner in the current study. Subjects were asked to indicate how they had been feeling in the 12 hours preceding data collection. The TMD scale consists of 58 items and demonstrated an internal consistency reliability of .94 in recovering individuals (*n* = 91) and .96 in partners (*n* = 82).

Procedures for Data Collection

Procedures for data collection were influenced by principles set forth by Dillman to maximize response to mail and telephone surveys (Dillman, 1978). The Total Design Method, based on social exchange theory, advocates maximizing response by establishing trust, minimizing costs to the subjects, and rewarding the subjects. In the current study, the investigator attempted to establish trust during the in-hospital contacts with subjects. Subjects were treated with respect as consultants to the project, and interviews were scheduled at a mutually convenient time. Specific appointments were made, and the investigator was consistently prompt. Minor requests by subjects were granted; for example, one subject asked for an early appointment and requested that the investigator bring coffee.

The surveys were designed to be attractive, to be interesting, and to minimize respondent burden through the selection of questions and response options. Financial costs to subjects were minimized by including a stamped, self-addressed envelope and offering to accept collect telephone calls if questions about the study arose. No specific reward was used, other than positive regard and verbal expression of appreciation.

Follow-up procedures were also influenced by Dillman (Dillman, 1978). A postcard was sent to all subjects 1 week after the 3-month survey as a thank you or a reminder. A second packet, including a cover letter, a second copy of the survey, and a second self-addressed stamped envelope, was sent to nonrespondents 4 months after surgery. Dillman's third follow-up procedure, sending a third letter and replacement questionnaire by certified mail, was not used because this study intends to generalize to the 3-month convalescent period.

The sequence of data collection and instruments used at each time are presented in Table 7. Characteristics and physical efficacy of the recovering individual were assessed in a structured interview done by the investigator within 72 hours of hospital discharge. One dyad was eliminated from the study because hospital discharge was delayed for almost 1 month after the interview and partner discharge survey had been completed. All but six interviews were completed on the telemetry units of the three centers prior to hospital discharge. Two interviews were completed at the inn associated with the smaller center on the day after hospital discharge, two interviews were completed in patients' homes within 3 days of hospital discharge, and one was completed in the intensive care unit. The latter patient was discharged home directly from the intensive care unit due to the unavailability of telemetry beds. One patient was discharged early and was missed by the investigator. His home was located more than 90 miles from Seattle, but complete chart review and partner discharge data were available. Therefore, he completed selected questions from the interview guide (duration of symptoms, duration of heart disease, and the mutuality scale) at the time of the 3-month survey.

Characteristics and physical efficacy expectations of the partner were assessed through the discharge survey. Partners who did not return the discharge survey were asked to complete selected questions (duration of symptoms, duration of diagnosis, personal health, and relationship duration) and the mutuality scale at the time of the 3-month survey.

Table 7

Sequence of Data Collection

Subject	Discharge	3-Month
Recovering Individual	**Interview** Cognitive function Duration of heart disease Preoperative activity Physical efficacy Dispositional optimism Mutuality POMS-LASA Education Race **Chart Review** Age Gender Primary illness NYHA functional class Medications Date of surgery Surgical procedure Repeat operation Comorbidity ICU course Length of ICU stay Step-down course Discharge class Date of discharge	**Survey** Postoperative activity POMS-LASA Dispositional optimism Strain in recovering role Demands Difficulty Satisfaction in recovery Recovery overall POMS Survey Evaluation
Partner	**Survey** General health Dispositional optimism POMS-LASA Mutuality Physical efficacy Relationship duration	**Survey** Strain in caregiving role Demands Difficulty Satisfaction in caregiving POMS-LASA Dispositional optimism Recovery overall Gender Race Education Occupation Discharge classes Age

Note: POMS-LASA = Profile of Mood States Linear Analog Self Assessment;
POMS = Profile of Mood States; ICU = Intensive care unit; NYHA = New York Heart Association.

The 3-month survey for both the recovering individual and the partner included measures of role strain, measures of role satisfaction, and measures of the dependent variables. Additional sociodemographic characteristics of the partner also were assessed at that time. The surveys were mailed to the recovering individual and partner in separate envelopes, each with a cover letter asking them to complete the questionnaire independently and return it in the stamped, self-addressed envelope.

Missing Data

The data collection procedures described above were designed to minimize missing data. For example, when the discharge survey was missing, selected measures from the discharge survey were included with the 3-month survey, and a second survey was sent to nonrespondents at 4 months. In addition, when it appeared that pages had been overlooked by the respondent, the missing pages were reproduced and sent to the subject with another stamped, self-addressed envelope.

Subjects were retained in analyses if they had valid scores for the outcome variable and on 80% of the predictor variables. Because two outcome variables were used for the recovering individuals, recovering individuals were retained if they had a valid score on either outcome variable. Subjects were included only in those analyses for which they had valid outcome variable scores. Of the 107 dyads who completed both phases of data collection, three dyads were omitted from the regression analysis of partner emotional distress due to nonvalid scores on the dependent variable. One dyad was dropped from the regression analyses because two (recovering individual activity and emotional distress) of the three dependent variables and more than 20% of the predictors were missing. For persons with 20% or fewer missing predictor variables, mean substitution was used in the regression analyses. At the final step of each multiple regression analysis, the number of missing predictors was entered to assess the importance of the number of missing predictors.

If responses were present on at least 80% of the items on multi-item scales, the item mean was substituted for missing values. If more than 20% of the items were missing, the subjects were given a missing score for the scale. For categorical variables, missing data were retained in the analyses through the creation of an additional category for "missing" data. This category allows the retention of all available information and provides a means to assess whether nonresponse on an item is associated systematically with other variables (Cohen & Cohen, 1983). Student's *t* tests were used to compare subjects with valid scores with those without valid scores on both predictor and outcome variables. Only subjects for whom no data were missing were used for assessing the internal consistency reliability of scales.

Data Analysis

Preliminary analyses were performed to examine the similarity of subjects at the three sites, as well as the similarity of those undergoing CABS alone with those undergoing valve replacement or combined procedures on the dependent variables of emotional distress and physical activity. Student's *t* test for independent samples was used with a significance level of .25. The use of a significance level of .25 when one hopes to find "no difference" was originally recommended by B. J. Winer, late professor of psychology at Purdue University as a conservative test (Personal communication, B. J. Stewart, 1988). There were no significant differences related to site. The *t* test for emotional distress of the recovering individual was not significant, and the two groups were combined in subsequent analyses. However, subjects recovering after CABS alone were significantly more active than those recovering from valvular or combined procedures ($t_{66.18} = -1.62$, $p = .11$). Similarly, the partners of patients recovering after cardiac valve or combined procedures reported less emotional distress ($t_{60.90} = -1.66$, $p = .10$) than partners of patients recovering after CABS alone. Therefore, surgical procedure (CABS alone or other) was entered at the first step in the regression analysis for activity and partner emotional distress.

The study aims, together with the observed differences related to surgical procedure, determined the order of entry for hierarchical regression. Partial *F* tests were obtained after the addition of each set of variables and evaluated for significance using an a priori significance level of .05. After controlling for surgical procedure, four sets of variables, individual, partner, and dyad characteristics, and contextual factors in convalescence were used to predict activity status of the recovering individual. Surgical procedure (i.e. CABS alone or other) was entered at step one, individual characteristics (i.e., age, gender, illness severity, optimism at hospital discharge, and residual optimism) were entered on step two, partner characteristics (i.e., age, perceived health, emotional state, and dispositional optimism) were entered on step three, dyad characteristics (i.e., perceived mutuality of the recovering individual and partner) were entered on step four, and contextual factors in convalescence (i.e., physical efficacy expectations of the recovering individual and partner and strain and satisfaction in the recovering and caregiving roles) were entered on step five. The sequence described above plus a fifth set of recovering individual convalescent-phase outcomes (i.e., activity status and emotional distress), were used to predict the emotional distress of the partner. Because there was no significant difference in emotional distress of the recovering individual associated with surgical procedure, surgical procedure was not controlled in the regression of recovering individual emotional distress.

Descriptive statistics and histograms were used to evaluate accuracy of data entry and shape of the distribution of scores. Data were screened for the presence of extreme scores using scatter diagrams of all predictor variables with the three outcome variables. These procedures revealed two very low scores for recovering individuals and two for partners on the mutuality and satisfaction scales. The distribution of scores for both of these scales deviated significantly from normal due to the effect of the extreme scores.

Barnett and Lewis recommend distinguishing among outliers as cases of inherent variability, measurement error, and execution error and considering the purpose of the study in deciding how to manage extreme scores (Barnett & Lewis, 1984). Each of these cases with extreme scores were reviewed individually. The two recovering individual's with low mutuality scores had spoken freely about problems in the relationship during the discharge interview and it was determined that these scores represented inherent variability as opposed to either execution or measurement error. No additional information was available related to the low partner mutuality scores or for the low satisfaction scores. Because there was no indication that any of these cases represented errors of execution or of excessive measurement error and the primary purpose in this study is to infer the basic characteristics of a model of recovery, statistical treatment was used to accommodate the extreme scores. The seven scores (two recovering individual mutuality, two partner mutuality, two recovering individual satisfaction, and one partner satisfaction) were trimmed by substituting the next higher score. This procedure lessens the influence of extreme scores on summary statistics and tests of estimation without excluding them from the analysis (Barnett & Lewis, 1984).

Regression diagnostics included residual analyses (scatter diagram of standardized residuals against standardized predicted values) to detect patterns suggestive of nonlinear relationships or heteroscedasticity. Normal probability plots were used to detect deviations from normality and casewise analysis was used to identify multivariate outliers.

Secondary hypotheses were tested using zero and first order correlation coefficients. Bonferroni's correction was used to adjust the .05 significance level for the number of secondary hypotheses tested (22 hypotheses for the recovering individual, $p \leq .002$ and 13 hypotheses for the partner, $p \leq .004$).

Content analysis (Holsti, 1969) was used to analyze responses to the open-ended questions. Sources of strain and satisfaction in the recovering and caregiving roles were the categories used for analysis.

CHAPTER 4

Results

The presentation of results is organized in the following manner. First, descriptive results are presented in relation to the constructs in the proposed model: characteristics of the recovering individual, partner, and dyad; contextual factors in convalescence; and convalescent-phase outcomes. Second, zero-order correlational relationships between predictor and outcome variables and those used in secondary hypothesis testing are presented. Third, the hierarchical multiple regression analyses used for primary hypothesis testing are presented. The chapter concludes with the results of the content analysis of responses to open-ended questions.

Descriptive Statistics

Characteristics of the Recovering Individual, Partner, and Dyad

Recovering individual and partner social status characteristics are summarized in Table 3 and disease characteristics in Table 4. Age of recovering individuals ranged from 63 to 82 years with a mean of 71.4 years (*SD* = 4.1 years) and the age of partners ranged from 49 to 84 years with a mean of 69.6 years (*SD* = 6.9 years). The sample was almost exclusively Caucasian (99% of patients; 98% of partners) and well-educated (92% had at least a high-school education).

Gender. The majority (80%) of the dyads consisted of a recovering male and a female partner. Gender differences were explored by comparing mean scores for males and females on major study variables. Because of the inequality of group size, two-tailed *t* tests with separate variance estimates were used to test the significance of the differences. Results of these analyses are summarized in Table 8. Patient age did not differ significantly by gender; however, male partners were significantly older than female partners ($t_{30.19}$ = -2.82, $p = .01$). Female recovering individuals were more symptomatic preoperatively as measured by NYHA classification ($t_{21.5} = 2.26$, $p = .03$) and had significantly higher mean scores on the illness severity index ($t_{32.22} = 2.51$, $p = .02$). Surgical procedure did not differ significantly by gender, but patients having repeat surgical procedures were more likely to be male ($t_{61.73} = -2.80$, $p = .01$).

In general, male recovering individuals had a higher mean preoperative activity status ($t_{30.37} = -3.63$, $p < .001$), higher physical efficacy mean score ($t_{41.63} = -3.53$, $p = .01$), and higher activity status 3 months after surgery ($t_{33.59} = -2.44$, $p = .02$) than did female recovering individuals. Male partners had a higher mean caregiving demands score than did female partners ($t_{29.77} = 3.30$, $p = .01$). The association between partner gender and caregiving demands ($r = .31$) remained significant after partialling out the variance related to age (semipartial correlation coefficient = .32). There were no other significant differences associated with gender.

Illness severity. The illness severity index was composed of three indicators: preoperative activity score, Charlson Comorbidity Index (CCI), and NYHA Functional Class. Preoperative activity scores ranged from 7.95 to 58.20 (possible range 0.00 to 58.20) with a mean score of 35.27 ($SD = 13.52$). The shape of the distribution of preoperative activity scores did not differ significantly from normal (skewness = -0.04; kurtosis = -0.96). Scores on the CCI ranged from 0 to 6; both the mode and median score was 1 and the mean score was 1.54 ($SD = 1.33$). Scores on the NYHA Functional Classification ranged from

Table 8

Descriptive Statistics for Major Study Variables by Gender

Variable	Female Patients *M*	*(SD)*	*n*	Male Patients *M*	*(SD)*	*n*	Grouped Scores *M*	*(SD)*	*n*
RI Age	71.81	(4.40)	21	71.41	(4.08)	86	71.43	(4.13)	107
CG Age	73.43	6.79	21	68.78	(6.68)	86	69.68	(6.77)	105
Preoperative Activity*	26.13	(12.92)	21	37.52	(12.75)	85	35.27	(13.52)	106
Postoperative Activity*	30.77	(10.32)	21	37.05	(11.57)	85	35.81	(11.56)	106
Illness Severity*	0.89	(1.78)	21	-0.22	(1.91)	86	0.01	(1.93)	107
RI Optimism	24.76	(3.94)	21	23.12	(4.61)	84	23.44	(4.54)	105
CG Optimism	21.36	(4.38)	21	22.89	(4.44)	86	22.59	(4.47)	107
RI Mutuality	3.52	(0.25)	21	3.53	(0.44)	86	3.53	(0.41)	107
CG Mutuality	3.46	(0.51)	21	3.50	(0.47)	87	3.49	(0.48)	107
CG Health	3.10	(0.63)	21	3.15	(0.70)	86	3.14	(0.68)	107
CG Emotional Distress, T1	123.06	(99.04)	20	117.53	(107.47)	80	119.64	(105.48)	100
RI Emotional Distress, T1	107.86	(67.36)	21	129.62	(87.17)	85	125.31	(83.78)	106
RI Demands	15.95	(3.46)	21	14.86	(5.23)	86	15.09	(4.47)	106
RI Satisfaction	4.41	(0.38)	21	4.52	(0.52)	86	4.50	(0.50)	106
RI Efficacy*	14.38	(5.24)	21	19.29	(7.31)	85	18.41	(7.18)	106
CG Demands*	16.76	(5.83)	21	12.10	(5.63)	86	13.09	(5.93)	107
CG Satisfaction	4.42	(0.52)	21	4.38	(0.74)	85	4.39	(0.70)	106
CG Efficacy	12.74	(5.43)	20	13.96	(5.05)	81	13.76	(5.13)	105
RI Emotional Distress, T2	2.05	(19.71)	21	1.36	(20.62)	83	1.50	(20.35)	104
CG Emotional Distress*, T2	9.37	(21.57)	19	-0.35	(20.77)	85	1.42	(21.15)	104

Note: RI = Recovering individual; CG = Caregiver (partner); T1 = measured prior to hospital discharge; T2 = measured 3 months after surgery; $^{*}p < .05$.

class I to class IV, both the mode and median scores were class II, and the mean score was 2.61 (*SD* = 0.93). NYHA functional class was not recorded for 30% of the subjects. Student's *t* tests using separate variance estimates indicated that neither preoperative activity status, comorbidity score, nor scores on the outcome variables were significantly different whether or not NYHA functional class was missing. Therefore, mean substitution was used for missing NYHA scores in computing the illness severity index.

Although both the NYHA functional classification and the CCI produce ordinal level data, they represent theoretically continuous concepts. Therefore, the negatively coded preoperative activity scores, comorbidity scores, and NYHA functional class scores were standardized by converting to *z* scores and summed to obtain an illness severity index. Scores on the resulting index of illness severity ranged from -4.59 to 5.58 (possible range -9.00 to 9.00) with a mean score of -0.01 (*SD* = 1.93). The shape of the distribution of illness severity scores did not differ significantly from normal (skewness = 0.21; kurtosis = 0.18). Table 9 summarizes descriptive statistics for continuous variables.

Optimism. At the time of hospital discharge, recovering individual optimism as measured by the Life Orientation Test (LOT) ranged from 9 to 32 (possible range 0 to 32) with a mean score of 23.44 (*SD* = 4.54). Three months after surgery, recovering individuals' LOT scores ranged from 8 to 32 with a mean score of 21.50 (*SD* = 4.25). At the two measurement times, the LOT scores were correlated ($r = .62$, $p < .001$), but the mean scores were significantly different ($t_{103} = 5.03$, $p < .001$). This combination of results suggests the presence of shifts in individual scores. Therefore, a residual change score for optimism was obtained. Residual change scores are preferred over simple

Table 9

Descriptive Statistics for Continuous Variables

Variable	*n*	% Missing	Range of Scores Possible	Range of Scores Observed	Mean (SD)	Skewness	Kurtosis
RI Characteristics							
RI Age, years	106	0	≥ 65	63 – 82	71.4 (4.11)	0.26	-0.23
RI Pre- Activity	106	0	0 – 58.2	8.0 – 58.2	35.3 (13.52)	-0.04	-0.96
RI Illness Severity	106	0	-9 – 9	-4.6 – 5.6	-0.0 (1.93)	0.21	0.18
RI Optimism, T1	104	1.9	0 – 32	9 – 32	23.4 (4.54)	-0.38	0.19
RI Optimism, T2	106	0	0 – 32	8 – 32	21.5 (4.25)	-0.05	0.35
RI Residual Optimism	103	2.8	----	-12.6 – 8.1	-0.0 (3.36)	-0.31	0.98
RI Emotional Distress, T1	106	0	-100 – 500	-64 – 310	125.3 (83.78)	0.24	-0.65
CG Characteristics							
CG Age, years	106	0	----	49 – 84	69.6 (6.91)	-0.51	0.72
CG Optimism, T1	102	3.8	0 – 32	9 – 32	22.8 (4.68)	-0.34	-0.09
CG Optimism, T2	105	0.9	0 – 32	12 – 32	22.6 (4.96)	0.01	-0.79
Mean Optimism	106	0	0 – 32	11.5 – 31.5	22.6 (4.47)	-0.07	-0.65
CG Emotional Distress, T1	97	8.5	-100 – 500	-93 – 439	119.6 (105.48)	0.54	0.58
Dyad Characteristics							
RI Mutuality	106	0	0.0 – 4.0	1.9 – 4.0	3.5 (0.41)	-1.51	3.48
Trimmed RI Mutuality	106	0	2.5 – 4.0	2.5 – 4.0	3.5 (0.37)	-0.92	0.58
CG Mutuality	106	0	2.4 – 4.0	2.1 – 4.0	3.5 (0.48)	-1.12	0.62
Trimmed CG Mutuality	106	0	2.4 – 4.0	2.4 – 4.0	3.5 (0.46)	-0.96	-0.02

(Table continues)

Table 9

Descriptive Statistics for Continuous Variables

Variable	*n*	% Missing	Range of Scores Possible	Range of Scores Observed	Mean (SD)	Skewness	Kurtosis
Contextual Factors in Convalescence							
RI Demands	106	0	0 – 34	5 – 28	15.1 (4.47)	0.36	-0.10
RI Difficulty	105	0.9	0.00 – 5.00	0.29 – 3.17	1.2 (0.55)	0.96	1.33
RI Satisfaction	106	0	1.00 – 5.00	1.58 – 5.00	4.5 (0.50)	-2.42	10.80
Trimmed RI Satisfaction	106	0	3.00 – 5.00	3.09 – 5.00	4.5 (0.43)	-1.13	1.42
RI Physical Efficacy	105	0.9	4.43 – 44.3	5.65 – 40.32	18.4 (7.18)	0.76	0.06
CG Demands	106	0	0 – 32	0 – 27	13.1 (5.93)	0.26	0.16
CG Difficulty	99	6.6	0.00 – 5.00	0.03 – 2.82	1.0 (0.64)	0.81	0.26
CG Satisfaction	105	0.9	1.00 – 5.00	1.00 – 5.00	4.4 (0.70)	-2.38	8.31
Trimmed CG Satisfaction	105	0.9	3.00 – 5.00	3.00 – 5.00	4.4 (0.56)	-1.02	0.20
CG Physical Efficacy	100	5.7	4.43 – 44.30	5.83 – 27.20	13.8 (5.13)	0.75	-0.22
Convalescent-Phase Outcomes							
RI Activity, T-2	106	0	0 – 58.2	13.45 – 58.20	35.8 (11.56)	-0.61	-0.97
RI POMS, T2	104	1.8	-40 – 192	-32 – 66	1.5 (20.35)	1.01	1.10
RI POMS-LASA, T2	105	0.9	-100 – 500	-87 – 390	37.3 (87.30)	1.31	2.1
CG POMS, T2	104	1.8	-40 – 192	-31 – 71	1.4 (21.15)	0.99	1.05
CG POMS-LASA, T2	103	2.8	-100 – 500	-100 – 401	69.8 (104.39)	0.94	1.09

Note: RI = Recovering Individual; CG = Caregiver (partner); POMS = Total Mood Disturbance Score of the Profile of Mood States; POMS-LASA = Total Mood Disturbance Score from POMS Linear Analog Self-Assessment; T1 = measured prior to hospital discharge; T2 = measured 3 months after surgery.

change scores because residual change scores are not dependent on the initial level as simple change scores are (Cohen & Cohen, 1983). The residual optimism score represents the difference between the actual optimism score 3 months after surgery and the optimism score predicted from the discharge optimism score. Residual optimism scores for the recovering individuals ranged from -12.61 to 8.06, with a mean score of -0.02 ($SD = 3.36$). The shape of the distribution of residual optimism scores did not differ significantly from normal (skewness = -0.07; kurtosis = -0.65).

Partners' scores on the LOT at the time of discharge ranged from 9 to 32, with a mean score of 22.78 ($SD = 4.68$). At 3 months, partners' scores on the LOT ranged from 12 to 32, with a mean score of 22.60 ($SD = 4.96$). Partners' mean optimism scores were not significantly different at the two measurement times and were correlated significantly ($r = .67$, $p < .001$). Because this correlation coefficient was below the preset criterion of .80 and the mean scores were not significantly different, partners' optimism scores for the two measurement times were averaged and a new variable, mean optimism, created for use in subsequent analyses. Partners' mean optimism scores ranged from 11.50 to 31.50 (possible range 0 to 32) with a mean score of 22.59 ($SD = 4.47$). The shape of the distribution of mean optimism scores did not deviate significantly from the normal distribution (skewness = -0.07; kurtosis = -0.65).

Mutuality. Recovering individuals' perceived mutuality scores ranged from 1.86 to 4.00, with a mean score of 3.53 ($SD = 0.41$) and a median score of 3.57. The distribution of recovering individuals' mutuality scores was significantly negatively skewed (skewness = -1.51) and peaked (kurtosis = 3.48). Examination of scatter diagrams of mutuality scores with the dependent variables further highlighted the presence of two outlying scores. Cases were examined individually and it was determined that neither score represented an error of execution. Because it was desirable to retain the cases while minimizing the effect of the extreme scores, scores were trimmed by replacing the two lowest mutuality scores with the value of the next higher score. After trimming, recovering individual mutuality scores ranged from 2.50 to 4.00 and the shape of the distribution of scores was less skewed (skewness = -0.92; kurtosis = 0.58).

Partners' perceived mutuality scores ranged from 2.13 to 4.00, with a mean score of 3.48 (*SD* = 0.48) and a median score of 3.60. The distribution of partners' mutuality scores also was negatively skewed (skewness = -1.09), but was not as peaked as that of the recovering individuals (kurtosis = 0.47). Scatter diagrams of partners mutuality scores with the dependent variables highlighted two outlying scores. The two cases were not the partners of the recovering individuals with the low mutuality scores. Partner mutuality scores were trimmed, substituting the next higher score for the two lowest scores. After trimming, the partners' mutuality scores ranged from 2.40 to 4.00 with reduced skewness and kurtosis (skewness = -0.96; kurtosis = -0.02). Untrimmed mutuality scores of the recovering individual and partner were correlated ($r = .58$, $p < .001$) and the trimmed scores demonstrated a similar relationship ($r = .59$, $p < .001$).

Partners' health and emotional distress. Partners rated their own physical health as excellent (28%), good (61%), fair (8%), or poor (3%). Partners' total mood disturbance scores at the time of hospital discharge, as measured by the POMS-LASA, ranged from -93 to 439 (possible range -100 to 500), with a mean score of 119.64 (*SD* = 105.48). The shape of the distribution of scores did not differ significantly from normal (skewness = 0.54, kurtosis = 0.58).

Contextual Factors in Convalescence

Role strain. Strain in the recovering role was measured as recovery demands and difficulty. Recovery demands scores ranged from 5 to 28 (possible range 0 to 34) with a mean score of 15.09 (SD = 4.47). The shape of the distribution of recovery demands scores did not differ significantly from normal (skewness = 0.36; kurtosis = -0.10). Recovery difficulty scores ranged from 0.29 to 3.17 (possible range 0.00 to 5.00), with a mean score of 1.17 (SD = 0.55). The shape of the distribution of recovery difficulty scores was positively skewed (skewness = 0.96) and peaked (kurtosis = 1.45). Recovery demands scores and recovery difficulty scores were highly correlated (r = .85, p < .001) and demonstrated similar patterns of association with the dependent variables (recovery demands with activity, r = -.31, p = .01; recovery difficulty with activity, r = -.34, p < .001; recovery demands with emotional distress, r = .45, p < .001; recovery difficulty with emotional distress, r = .46, p < .001). Because recovery demand scores were highly correlated with recovery difficulty scores, both variables had similar patterns of association with outcome variables, and fewer data were missing for the recovery demands than the recovery difficulty scale, the recovery demands score was used as the indicator of strain in the recovering role in multiple regression analyses.

Strain in the caregiving role was measured as caregiving demands and caregiving difficulty. Scores on the caregiving demands scale ranged from 0 to 27 (possible range 0 to 32) with a mean score of 13.09 (SD = 5.93). The shape of the distribution of caregiving demands scores did not differ significantly from normal (skewness = 0.26; kurtosis = 0.16). Caregiving difficulty scores ranged from 0.03 to 2.82 (possible range 0.00 to 5.00) with a mean score of 0.97 (*SD* = 0.64). The shape of the distribution of caregiving difficulty scores was positively skewed (skewness = 0.81), although not peaked (kurtosis = 0.26). Scores from the caregiving demands and difficulty scales were highly correlated ($r = .91$, $p < .001$), the scores demonstrated similar patterns of association with outcome variables and fewer data were missing on the caregiving demands scale. Therefore, the caregiving demands scale was used as the indicator of caregiving strain in multiple regression analyses. Scores from the recovery demands scale and the caregiving demands scales were correlated ($r = .42$, $p < .001$), but demonstrated different patterns of association with other variables of interest.

Role satisfaction. Scores for satisfaction in the recovering role ranged from 1.58 to 5.00 (possible range 0.00 to 5.00) with a mean score of 4.50 (*SD* = 0.50) and a median score of 4.50. The distribution of scores was significantly negatively skewed (skewness = -2.42) and peaked (kurtosis = 10.80). Examination of scatter diagrams for satisfaction in the recovering role with the dependent variables highlighted one outlying score. Examination of the individual case provided no indication of execution error, so the score was replaced by the next highest score. After trimming, skewness was reduced to -1.13 and kurtosis to 1.48.

Scores for caregiving satisfaction ranged from 1.00 to 5.00 (possible range 0.00 to 5.00) with a mean of 4.39 (*SD* = 0.70) and a median of 4.58. The distribution of scores was significantly negatively skewed (skewness = -2.38) and peaked (kurtosis = 8.31). Two scores that appeared atypically low were identified and the cases reviewed. No indication of an error in execution was found, so the scores were replaced by the next higher score. After trimming, the distribution of caregiving satisfaction scores showed reduced skewness and kurtosis (skewness = -1.02; kurtosis = 0.20). Satisfaction scores in the recovering and caregiving roles were not correlated significantly ($r = .18$), but trimmed satisfaction in recovering and caregiving scores were correlated significantly ($r = .33$, $p < .001$).

Physical efficacy. Physical efficacy scores of the recovering individuals ranged from 5.65 to 40.32 (possible range of scores 4.43 to 44.30) with a mean score of 18.41 ($SD = 7.18$). The shape of the distribution of recovering individuals' physical efficacy scores did not differ significantly from normal (skewness = 0.76; kurtosis = 0.06). Partners' physical efficacy scores ranged from 5.83 to 27.20 (possible range 4.43 to 44.30) with a mean score of 13.76 ($SD = 5.13$). The shape of the distribution of partners' physical efficacy scores did not differ significantly from normal (skewness = 0.75, kurtosis = -0.22). The mean recovering individual physical efficacy score was significantly higher than the mean partner physical efficacy score ($t_{100} = -5.88$, $p < .001$). Physical efficacy scores of recovering individuals and partners were not significantly correlated ($r = .19$, $p = .06$) and demonstrated different patterns of association with other variables of interest. Neither recovering individual's nor partner's physical efficacy score was significantly associated with preoperative activity status. Partner's physical efficacy score was associated significantly with the recovering individual's activity status at 3 months ($r = .20$, $p = .04$), but recovering individual's efficacy score was not associated with 3-month activity status ($r = .16$, $p = .11$).

Convalescent-Phase Outcomes

Activity status. The recovering individuals' activity scores 3 months after surgery, as measured by the DASI, ranged from 13.45 to 58.20 (possible range 0.00 to 58.20) with a mean score of 35.81 (SD = 11.76). The shape of the distribution of activity scores was not skewed significantly (skewness = -.171), but was significantly flattened (kurtosis = -1.07). In general, 3 months after surgery slightly more recovering individuals reported the ability to engage in routine daily activities than had done so in the month before surgery. In contrast, fewer subjects reported the ability to engage in recreational activities 3 months after surgery than had done so in the month before surgery. Table 10 presents items from the DASI in order of metabolic demand, along with preoperative and postoperative frequencies. Preoperative and postoperative activity scores were correlated ($r = .51$, $p < .001$) and the mean scores did not differ significantly from the month before to 3 months after surgery ($t_{100} = -0.34$, $p = .74$).

Emotional distress. The POMS total mood disturbance scores for the recovering individual ranged from -32 to +66 (possible range -32 to 192) with a mean score of 1.5 (SD = 20.35). The shape of the distribution of total mood disturbance scores was positively skewed (skewness = 1.01) and peaked (kurtosis = 1.10). Total mood disturbance scores for the partner ranged from -31 to +71 (possible range -32 to 192) with a mean score of 1.42 (SD = 21.15). The shape of the distribution of partner total mood disturbance scores resembled that of the recovering individuals (skewness = 0.99; kurtosis = 1.05). The mean total mood disturbance score of partners was not different significantly from that of the recovering individuals. Despite the apparent similarity in total mood disturbance scores for recovering individuals and partners, the scores were not correlated

Table 10

Duke Acitivity Scale Items in Order of Increasing Metabolic Demand, (N = 106)

Items in order of increasing metabolic demand	Preoperative			Postoperative		
	Yes (%)	No (%)	Missing (%)	Yes (%)	No (%)	Missing (%)
Q2. Walk indoors around your house; 1.75 METS	104 (98.1)	2 (1.9)	0	106 (100.0)	0	0
Q6. Light housework like dusting or washing dishes; 2.7 METS	106 (100.0)	0	0	106 (100.0)	0	0
Q1. Self care, eating, dressing, or using the toilet; 2.75 METS	104 (98.1)	2 (1.9)	0	106 (100.0)	0	0
Q3. Walk a block or two on level ground; 2.75 METS	93 (87.7)	13 (12.3)	0	104 (98.1)	2 (1.9)	0
Q7. Moderate housework like vacuuming, sweeping floors or carrying in groceries; 3.5 METS	91 (85.8)	15 (14.2)	0	98 (92.5)	8 (7.5)	0
Q9. Yardwork like raking leaves, weeding or pushing the lawn mower; 4.5 METS	70 (66.0)	36 (34.0)	0	60 (56.6)	44 (41.5)	2 (1.9)
Q10. Sexual relations; 5.25 METS	55 (51.9)	49 (46.2)	2 (1.9)	60 (56.6)	43 (40.6)	3 (2.8)
Q4. Climb a flight of stairs or walk up a hill; 5.5 METS	83 (78.3)	23 (21.7)	0	104 (98.1)	2 (1.9)	0
Q11. Moderate recreational activities like golf, bowling, dancing doubles tennis or throwing a baseball or football; 6.0 METS	61 (57.5)	45 (42.5)	0	43 (40.6)	61 (57.5)	2 (1.9)
Q12. Strenuous sports like swimming, singles tennis, football, basketball or skiing; 7.5 METS	17 (16.0)	89 (84.0)	0	7 (6.6)	97 (91.5)	2 (1.9)
Q8. Heavy housework like scrubbing floors; 8.0 METS	66 (62.3)	40 (37.7)	0	47 (44.3)	57 (53.8)	2 (1.9)
Q5. Run a short distance; 8.0 METS	41 (38.7)	65 (61.3)	0	67 (63.2)	38 (35.8)	1 (0.9)

Note: One MET is a unit of energy expenditure equivalent to approximately 3.5 milliliters of oxygen uptake per kilogram of body weight per minute and approximates the energy expenditure while sitting quietly in a chair.

significantly ($r = .06$, $p = .52$). Table 11 presents descriptive statistics for each of the POMS subscales for the recovering individuals and partners.

Zero-Order Correlational Analysis

Outcome with Predictor Variables

Before multiple regression analysis was performed, the zero-order correlation of individual predictor variables with each of the outcome variables was examined. Table 12 presents zero-order correlation coefficients for predictor with outcome variables. Appendix F contains a complete correlation matrix for all study variables.

Activity status. The activity status of the recovering individual 3 months after surgery was more highly correlated with illness severity ($r = -.55$, $p < .001$) than with any other predictor variable. Among the sets of recovering individual, partner, and dyad characteristics, other variables associated significantly with activity status include age ($r = -.20$, $p = .04$) and residual optimism ($r = .21$, $p = .03$) of the recovering individual, and gender of both the recovering individual ($r = .22$, $p = .03$) and partner ($r = -.22$, $p = .03$). Activity status was associated with contextual factors in convalescence including, recovery demands ($r = -.31$, $p = .01$), satisfaction in the recovering role ($r = .34$, $p < .001$), and caregiving demands ($r = -.43$, $p < .001$). Interestingly, activity status of the recovering individual was associated with partner's physical efficacy score ($r = .20$, $p = .04$), but not with the recovering individual's physical efficacy score ($r = .16$, $p = .11$).

Emotional distress of the recovering individual. Total mood disturbance of the recovering individual 3 months after surgery was associated with illness severity ($r = .24$, $p = .02$), recovering individual's optimism score

Table 11

Descriptive Statistics for Profile of Mood States Subscales

Subscales (Number of Items) (0 = not at all, 4 = extremely)	Recovering Individual			Partner		
	Mean (SD)	Range	*N*	Mean (SD)	Range	*N*
Tension-Anxiety (9)	5.07 (4.11)	0 – 18	104	6.23 (5.32)	0 – 22	104
Depression-Dejection (15)	3.06 (4.97)	0 – 30	104	3.60 (5.85)	0 – 31	104
Anger-Hostility (12)	2.56 (5.01)	0 – 34	104	2.56 (5.01)	0 – 34	104
Vigor-Activity (8)	19.07 (6.21)	5 – 32	106	18.68 (5.93)	4 – 32	104
Fatigue-Inertia (7)	5.56 (4.58)	0 – 18	105	5.91 (5.48)	0 – 24	105
Confusion-Bewilderment (7)	4.29 (2.84)	0 – 12	104	4.60 (3.93)	0 –19	103
Total Mood Disturbance (58)	1.50 (20.35)	-32 to 66	104	1.42 (21.15)	-31 to 71	104

Table 12

Zero-Order Correlation Coefficients for Outcome with Predictor Variables

Predictor	RI Activity, *r* (*n*)	RI Emotional Distress, *r* (*n*)	CG Emotional Distress, *r* (*n*)
RI Characteristics			
RI Age, T1	-.204* (106)	.056 (104)	.128 (104)
RI Gender[a], T1	.217* (106)	-.014 (104)	-.179 (104)
RI Illness Severity, T1	-.546** (106)	.242* (104)	.201* (104)
RI Optimism, T1	.075 (104)	-.301** (103)	.116 (102)
RI Residual Optimism, T2	.212* (103)	-.205* (102)	-.038 (101)
Dyadic Characteristics			
RI Mutuality[t], T1	-.022 (106)	-.242* (104)	-.345** (104)
CG Mutuality[t], T-	.050 (106)	-.257** (104)	-.437** (104)
CG Characteristics			
CG Age, T2	-.130 (106)	.080 (104)	.092 (104)
CG Gender[a], T2	-.217* (106)	.014 (104)	.179 (104)
CG Health, T1	-.071 (106)	.020 (104)	-.388** (104)
CG Emotional Distress, T1	-.123 (97)	.077 (96)	.387** (95)
CG Mean Optimism	.054 (106)	-.219 (104)	-.474** (104)
Contextual Factors			
RI Demands[b], T2	-.310** (106)	.454** (104)	.120 (104)
RI Difficulty, T2	-.339** (104)	.457** (102)	.121 (102)
RI Satisfaction[t], T2	.401** (106)	-.567** (104)	-.276* (104)
RI Physical Efficacy, T1	.156 (105)	-.136 (104)	-.291** (103)
CG Demands[b], T2	-.428** (106)	.242* (104)	.448** (104)
CG Difficulty, T2	-.391** (98)	.317** (97)	.506** (96)
CG Satisfaction[t], T2	.137 (105)	-.243 (103)	-.348* (103)
CG Physical Efficacy, T1	.197* (100)	-.048 (98)	-.035 (98)
Outcomes			
RI Activity, T2		-.287** (103)	-.192 (103)
RI Emotional Distress, T2	-.287** (103)		.064 (101)
CG Emotional Distress, T2	-.191* (103)	.064 (101)	

Note: RI = Recovering Individual; CG = Caregiver (partner); T1 = Measured prior to hospital discharge; T2 = Measured 3-months postsurgery. For variables measured on a continuum of low to high, higher scores correspond to the name of the instrument. [a]Gender: 0 = female and 1 = male. [b]Demands, 0 = no and 1 = yes. [t] = trimmed score (next lowest score substitued for two lowest scores). *$p < .05$; ** $p < .01$.

measured at hospital discharge ($r = -.30$, $p = .01$), recovering individual's residual optimism score ($r = -.21$, $p = .04$), and mutuality as perceived by both the recovering individual ($r = -.24$, $p = .01$) and partner ($r = -.27$, $p = .01$). Total mood disturbance of the recovering individual was more highly correlated with contextual factors in convalescence than with individual, partner, or dyad characteristics. Of the contextual factors in convalescence, total mood disturbance of the recovering individual was associated with recovery demands ($r = .45$, $p < .001$), caregiving demands ($r = .24$, $p = .01$), satisfaction in the recovering role ($r = -.49$, $p < .001$), and satisfaction in the caregiving role ($r = .24$, $p = .01$).

Emotional distress of the partner. Partners' total mood disturbance 3 months after surgery was associated with illness severity ($r = .21$, $p = .03$), mutuality as perceived by both the recovering individual ($r = -.36$, $p < .001$) and partner ($r = -.42$, $p < .001$), caregiving demands ($r = .45$, $p < .001$), and satisfaction in the caregiving role ($r = -.35$, $p = .01$).

Secondary Hypothesis Testing

Zero-order correlation coefficients and one first-order correlation coefficient were used to test the secondary hypotheses. Due to the large number of secondary hypotheses (22 related to the recovering individual and 13 related to the partner), the significance level was adjusted using the Bonferroni correction. This resulted in a significance level of .002 for hypothesis testing related to the recovering individual and of .004 for hypothesis testing related to the partner. Correlation coefficients used in hypothesis testing are presented in Table 13.

Table 13

Correlation Coefficients Used for Secondary Hypothesis Testing

Hypothesis	Variables	Corr.	(p)
1a. After controlling for illness severity, age of the recovering individual will be inversely associated with physical activity and emotional distress.	RI age, RI activity given illness severity	-.100[a]	
	RI age, RI emotional distress given illness severity	-.004[a]	
1b. RI optimism will be positively associated with physical self-efficacy, satisfaction in the recovery role, and physical activity at 3 months.	RI optimism T1, physical efficacy	.065	(.51)
	RI optimism T1, RI satisfaction	.159	(.11)
	RI optimism T1, RI activity	.075	(.45)
1c. RI optimism will be inversely associated with strain in the recovery role and with emotional distress at 3 months.	**RI optimism, RI demands**	**-.128**	**(.19)**
	RI optimism, RI emotional distress T2	**-.301**	**(.002)***
1d. For the recovering individual, more mutuality will be associated with less strain, more satisfaction in the recovery role, and less emotional distress at 3 months.	RI mutuality, RI satisfaction	.171	(.08)
	RI mutuality, RI demands	-.179	(.07)
	RI mutuality, RI emotional distress T2	-.242	(.01)
1e. For the recovering individual, the partner's dispositional optimism will be associated with less strain and more satisfaction in the recovery role.	CG optimism, RI demands	-.121	(.22)
	CG optimism, RI satisfaction	.185	(.06)
1f. For the recovering individual, partner's dispositional optimism will be associated with more physical activity and less emotional distress at 3 months.	CG optimism, RI activity	.054	(.58)
	CG optimism, RI emotional distress T2	-.219	(.03)
1g. More strain in the recovery role will be associated with less physical activity and more emotional disturbance at 3 months.	**RI demands, RI activity**	**-.310**	**(.001)***
	RI demands, RI emotional distress T2	**.454**	**(<.001)***
1h. For the recovering individual, more caregiver strain will be associated with less physical activity and more emotional distress at 3 months.	**CG demands, RI activity**	**-.428**	**(<.001)***
	CG demands, CG emotional distress T2	**.449**	**(<.001)***
1i. More satisfaction in the recovery role will be associated with more activity and less emotional distress at 3 months.	**RI satisfaction, RI activity**	**.345**	**(<.001)***
	RI satisfaction, CG emotional distress T2	**-.247**	**(.01)**
1j. More satisfaction in the caregiver role will be associated with more physical activity and less emotional distress of the recovering individual at 3 months.	CG satisfaction, RI activity	.076	(.44)
	CG satisfaction, RI emotional distress T2	-.194	(.05)

(Table continues)

Note: Shaded and starred hypotheses are significant at Bonferroni adjusted level of significance. RI = Recovering Individual; CG = Caregiver (partner); T1 = measured prior to hospital discharge; T2 = measured 3 months after surgery.

Table 13

Correlation Coefficients Used for Secondary Hypothesis Testing

Hypothesis	Variables	*Corr.*	*(p)*
1k. For the recovering individual, physical self-efficacy will be positively associated with physical activity at 3 months.	RI physical efficacy, RI activity	.156	(.11)
1l. Partners' efficacy projections will be positively associated with physical activity of the recovering individual at 3 months.	CG physical efficacy, RI activity	.203	(.04)
2a. For the partner, more mutuality will be associated with less strain and more satisfaction in the caregiver role and with less emotional disturbance at 3 months.	CG mutuality, CG demands CG mutuality, CG satisfaction CG mutuality, CG emotional distress T2	-.281 .305 .422	(.01) (<.001)* (<.001)*
2b. Older age, poorer physical health, more emotional disturbance, and female gender will be associated with more strain in the caregiver role.	CG age, CG demands CG gender, CG demands CG emotional distress T1, CG demands	-.017 .313 .281	(.86) (.001)* (.01)
2c. Dispositional optimism will be associated with higher physical efficacy projections and with more satisfaction and less strain in the caregiver role.	CG optimism, CG physical efficacy CG optimism, CG demands CG optimism, CG satisfaction	-.008 -.212 .114	(.93) (.03) (.25)
2d. Dispositional optimism will be inversely associated with emotional disturbance at 3 months.	CG optimism, CG emotional distress T2	-.474	(<.001)*
2e. More satisfaction in the recovery role will be associated with less emotional disturbance for the partner at 3 months.	RI satisfaction, CG emotional distress T2	-.247	(.01)
2f. More caregiver satisfaction will be associated with less emotional disturbance at 3 months.	CG satisfaction, CG emotional distress, T2	-.247	(.01)
2g. Partner's emotional distress at 3 months will be positively associated with the emotional distress of the recovering individual at 3 months.	CG emotional distress T2, RI emotional distress T2	.064	(.52)

Note: Shaded and starred hypotheses are significant at Bonferroni adjusted level of significance. RI = Recovering Individual; CG = Caregiver (partner); T1 = measured prior to hospital discharge; T2 = measured 3 months after surgery.

Four secondary hypotheses related to convalescent phase outcomes of the recovering individual were supported: (1c) Optimism will be inversely associated with emotional distress ($r = -.30$, $p = .002$); (1g) More strain in the recovering role will be associated with more emotional distress ($r = .45$, $p < .001$); (1h) More caregiver strain will be associated with less activity ($r = -.43$, $p < .001$); and, (1i) More satisfaction in the recovering role will be associated with more physical activity ($r = .34$, $p < .001$). Two hypotheses related to convalescent phase outcomes of the partner were supported: (2a) More mutuality as perceived by the partner will be associated with less emotional distress ($r = -.42$, $p < .001$) and more satisfaction ($r = .30$, $p < .001$); and, (2d) More optimism will be associated with less emotional distress ($r = -.47$, $p < .001$).

Multiple Regression Analysis

Three hierarchical multiple regression analysis were used to test the primary hypotheses of the study:

1. Four sets of variables (characteristics of the individual, partner, and dyad, and contextual factors in convalescence) will each contribute significantly to the explained variance in the physical activity of the recovering individual 3 months after cardiac surgery.

2. Four sets of variables (characteristics of the individual, partner, and dyad, and contextual factors in convalescence) will each contribute significantly to the explained variance in the emotional distress of the recovering individual 3 months after cardiac surgery.

3. Five sets of variables (characteristics of the recovering individual, partner, and dyad, contextual factors in convalescence, and the recovering

individual's convalescent phase outcomes) will each contribute significantly to the explained variance in the emotional distress of the partner at 3 months.

Dyads were included in the analysis if they had valid scores for the outcome variables and on 80% of the predictor variables. Mean substitution was used for dyads missing 20% or fewer of the predictor variables. Because two outcome variables were used for the recovering individuals, recovering individuals were retained if they had a valid score on either outcome variable and at least 80% of the predictor variables. Subjects were included only in those analyses for which they had valid outcome variable scores. An a priori significance level of .05 was used for hypothesis testing.

Predictors of Activity Status

To test the first hypothesis that recovering individual, partner, and dyad characteristics, together with contextual factors in convalescence would each contribute significantly to the explained variance in physical activity, recovering individuals' activity scores were regressed on the four sets of predictors. Because mean activity status was significantly different for subjects having CABS alone compared with those having cardiac valve or combined procedures, surgical procedure was entered first, but did not contribute significantly to the explained variance ($R^2 = .02$). Table 14 presents the summary of this regression analysis.

In general, only characteristics of the recovering individual contributed significantly to the explained variance in activity at 3 months. Recovering individual characteristics explained 36% of the variance (adjusted $R^2 = .34$). None of the other three steps resulted in a significant increase in the amount of explained variance. At the final step, all of the predictors together explained 47%

Table 14

Recovering Individual Activity Multiple Regression Summary, (N = 94)

Step	Variable	R^2 Change	Sig Change	R^2	Adj R^2	F(Eqn)	Sig F	β weight at last step
1	**Surgical Procedure[a]**	.023	.118	.023	.014	2.483	.118	.156
2	**RI Characteristics**	.358	<.001	.381	.344	10.186	<.001	
	Optimism, T1							.020
	Residual Optimism							.088
	Age							-.103
	Gender[b]							.018
	Illness Severity							-.450*
3	**CG Characteristics**	.024	.442	.405	.343	6.476	<.001	
	Health							-.124
	Emotional distress, T1							-.034
	Optimism							.041
	Age							.054
4	**Dyad Characteristics**	.008	.515	.414	.338	5.471	<.001	
	RI Mutuality[t]							-.113
	CG Mutuality[t]							-.016
5	**Contextual Factors**	.055	.184	.469	.359	4.270	<.001	
	RI Demands							.016
	RI Satisfaction[t]							.119
	RI Physical Efficacy							.077
	CG Demands							-.160
	CG Satisfaction[t]							.078
	CG Physical Efficacy							.055

Note: Sig Change = Significance of change (two-tailed); Adj = Adjusted; Eqn = Equation; Sig F = Significance of F test. RI = Recovering individual; CG = Caregiver (partner). [a]Surgical procedure: 0 = valve or combined procedures; 1 = CABS only. [b]Gender: 0 = Female, 1 = Male; [t] = trimmed score (next lowest score substituted for two lowest scores). *$p < .05$.

of the variance in activity status (adjusted R^2 = .36). The adjusted R^2 is reported because it corrects the optimistic bias of R^2 and more closely reflects the goodness of fit of the model to the population. Examination of the standardized partial regression coefficients (beta weights) provides information about the relative importance of predictors in the analysis. Beta weights are contingent upon the other variables in the analysis and represent the relative importance of each predictor. The variable with the largest beta weight throughout the regression analysis was illness severity. Illness severity had a beta weight of -.59 at the first step and of -.45 on the final step. Thus the beta weight decreased only by .14 after all the other variables had been entered. No other predictor had a significant beta weight at the last step. Relative shifts in beta weights may clarify the independent contribution of predictors. Although there are no published guidelines for significance of beta weight shifts, based on experience a cut off of greater than or equal to .10 was used to evaluate large shifts (B. J. Stewart, personal communication, August, 1993). When illness severity entered the equation, large shifts in beta weights were seen for recovery and caregiving demands, recovery satisfaction, and caregiver physical efficacy. Table 15 demonstrates shifts in beta weights at each step of the regression analysis.

Residual analysis. Residual analysis revealed only three cases beyond ± 2 standard errors of the estimate and no cases beyond ± 3 standard errors of the estimate. The scatter diagram of standardized predicted versus standardized residual scores produced a cloud of points without a systematic pattern. The normal probability plot of the standardized residuals suggested only minor deviation from normal. Based on the residual analysis, the statistical assumptions of normality, independence of errors, and constant error variance do

Table 15

Changes in Beta Weights at Each Step of Regression Analysis for Recovering Individual Activity, (N = 94)

Predictors	Correlation with Activity	Step 1 β weights	Step 2 β weights	Step 3 β weights	Step 4 β weights	Step 5 β weights
1. Surgical procedure[a]	.153	.153	.242	.208	.201	.156
2. RI characteristics						
Optimism, T1	.075	.114	.068	.056	.057	.020
Residual Optimism	.212*	.215	.103	.108	.111	.088
Gender	.217*	.207	.074	.085	.087	.018
Illness severity	-.546*	-.590	-.527	-.540	-.540	-.450*
Age	-.204*	-.181	-.068	-.116	-.120	-.103
2. CG characteristics						
Optimism	.054	.064	.048	.075	.076	.041
Health	-.071	-.039	-.095	-.127	-.130	-.124
Age	-.130	-.129	.102	.081	.089	.054
Emotional distress	-.123	-.122	-.067	-.056	-.071	-.034
3. Dyad characteristics						
RI Mutuality[t]	-.022	-.008	-.028	-.074	-.115	-.113
CG Mutuality[t]	.050	.060	.047	.018	.079	-.016
4. Contextual Factors						
RI Demands	-.310*	-.314	-.133	-.103	-.102	.016
RI Satisfaction[t]	.401*	.391	.184	.161	.172	.119
RI Physical Efficacy	.155	.183	.110	.113	.112	.077
CG Demands	-.428*	-.414	-.237	-.220	-.221	-.161
CG Satisfaction[t]	.133	.145	.151	.130	.148	.078
CG Physical Efficacy	.203*	.194	.075	.089	.098	.055

Note: Beta weights below the bold line represent variables not yet in the equation. T1 = measured priot to hospital discharge; RI = Recovering individual; CG = Caregiver (partner); [t] = trimmed score (next lowest score substituted for two lowest scores); [a]Surgical procedure: 0 = valve or combined procedures; 1 = CABS alone. $^{*}p < .05$.

not appear to have been violated.

Contribution of missing predictors. To test the significance of missing predictors the multiple regression analysis was repeated entering the predictors in the same order. One additional variable, number of missing predictors, was entered as a final step. The number of missing predictors did not contribute significantly to the explained variance (R^2 change = .000).

Predictors of Recovering Individuals' Emotional Distress

To test the second hypothesis that recovering individual, partner, and dyad characteristics, together with contextual factors in convalescence would each contribute significantly to the explained variance in emotional distress, recovering individuals' total mood disturbance scores were regressed on the four sets of predictors. Table 16 presents the summary of this regression analysis.

In general, recovering individual characteristics (R^2 = .15, p = .005) and contextual factors in convalescence (R^2 change = .21, p = .001) each contributed significantly to the explained variance in emotional distress of the recovering individual. The four sets of predictors together explained 44% of the variance in emotional distress of the recovering individual (adjusted R^2 = .33). Recovery demands and recovery satisfaction had the highest beta weights throughout the regression analysis and the beta weights remained significant at the final step. The only other variable with a significant beta weight at the last step was optimism of the recovering individual measured prior to hospital discharge. When the set of contextual factors in convalescence entered the equation, a large shift in the beta weight of illness severity was seen. This indicates that the variance in emotional distress explained by illness severity and that explained by contextual factors overlap in this analysis. Smaller, but still of interest, shifts

Table 16

Recovering Individual Emotional Distress Multiple Regression Summary, (N = 94)

Step	Variable	R^2 Change	Sig Change	R^2	Adj R^2	F (Eqn)	Sig F	β weight at last step
1	**RI Characteristics**	.152	.005	.152	.110	3.586	.005	
	Optimism, T1							-.176*
	Residual Optimism							-.031
	Age							-.062
	Gender[a]							.076
	Illness Severity							.025
2	**CG Characteristics**	.057	.141	.209	.135	2.825	.006	
	Health							.086
	Emotional distress, T1							-.054
	Optimism							-.119
	Age							.114
3	**Dyad Characteristics**	.024	.239	.233	.143	2.597	.006	
	RI Mutuality[t]							-.078
	CG Mutuality							-.016
4	**Contextual Factors**	.205	.001	.438	.329	4.029	<.001	
	RI Demand							.219*
	RI Satisfaction[t]							-.395*
	RI Physical Efficacy							-.064
	CG Demands							-.044
	CG Satisfaction[t]							-.024
	CG Physical Efficacy							.055

Note: Sig Change = Significance of change (two-tailed); Adj = Adjusted; Eqn = Equation; Sig F = Significance of F test. RI = Recovering Individual; CG = Caregiver (partner). T1 = measured before hospital discharge. [a]Gender: 0 = female; 1 = male. [t]trimmed score (next lowest score substituted for two lowest scores). *$p < .05$.

were seen in the beta weights of both recovering individual and partner optimism scores when contextual factors entered the equation. Table 17 demonstrates shifts in beta weights in this regression analysis.

Residual analysis. Residual analysis revealed four cases beyond ± 2 standard errors of the estimate and no cases beyond ± 3 standard errors of the estimate. The scatter diagram of standardized predicted versus standardized residual scores produced a cloud of points without a systematic pattern. The normal probability plot of the standardized residuals suggested only minor deviation from normal. Based on the residual analysis, the statistical assumptions of normality, independence of errors, and constant error variance do not appear to have been violated.

Contribution of missing predictors. To test the significance of missing predictors the multiple regression analysis was repeated entering the predictors in the same order. One additional variable, number of missing predictors, was entered as a final step. The number of missing predictors did not contribute significantly to the explained variance in emotional distress of the recovering individual (R^2 change = .000).

Predictors of Partners' Emotional State

To test the third hypothesis that recovering individual, partner, and dyad characteristics, together with contextual factors in convalescence and convalescent-phase outcomes of the recovering individual would each contribute significantly to the explained variance in emotional distress of the partner, partners' total mood disturbance scores were regressed on the five sets of predictors. Because partners' mean emotional distress was significantly less for dyads recovering from valve or combined procedures, surgical procedure was were seen in the beta weights of both recovering individual and partner optimism scores when contextual factors entered the equation. Table 17 demonstrates shifts in beta weights in this regression analysis.

Residual analysis. Residual analysis revealed four cases beyond ± 2 standard errors of the estimate and no cases beyond ± 3 standard errors of the estimate. The scatter diagram of standardized predicted versus standardized residual scores produced a cloud of points without a systematic pattern. The normal probability plot of the standardized residuals suggested only minor deviation from normal. Based on the residual analysis, the statistical assumptions of normality, independence of errors, and constant error variance do not appear to have been violated.

Contribution of missing predictors. To test the significance of missing predictors the multiple regression analysis was repeated entering the predictors in the same order. One additional variable, number of missing predictors, was entered as a final step. The number of missing predictors did not contribute significantly to the explained variance in emotional distress of the recovering individual (R^2 change = .000).

Predictors of Partners' Emotional State

To test the third hypothesis that recovering individual, partner, and dyad characteristics, together with contextual factors in convalescence and convalescent-phase outcomes of the recovering individual would each contribute significantly to the explained variance in emotional distress of the partner, partners' total mood disturbance scores were regressed on the five sets of predictors. Because partners' mean emotional distress was significantly less for dyads recovering from valve or combined procedures, surgical procedure was

Table 17

Changes in Beta Weights at Each Step of Regression Analysis for Recovering Individual Emotional Distress, (N = 92)

Predictors	Corr. with Emotional Distress	Step 1 β weights	Step 2 β weights	Step 3 β weights	Step 4 β weights
1. RI characteristics					
Optimism, T1	-.297*	-.274	-.259	-.230	-.181*
Residual Optimism	-.204*	-.169	-.159	-.142	-.010
Gender	-.015	.003	.057	.060	.063
Illness severity	.240*	.163	.192	.201	.033
Age	.052	.033	.018	-.002	-.074
2. CG characteristics					
Optimism	-.219*	-.195	-.259	-.198	-.093
Health	.021	.077	.168	.151	.083
Age	.077	.039	.046	.057	.114
Emotional distress, T1	.077	.038	-.015	-.023	-.033
3. Dyad characteristics					
RI Mutuality[t]	-.245*	-.192	-.146	-.098	-.077
CG Mutuality[t]	-.257*	-.208	-.145	-.092	-.026
4. Contextual Factors					
RI Demands	.456*	.385	.360	.351	.230*
RI Satisfaction[t]	-.569*	-.514	-.479	-.464	-.400*
RI Physical Efficacy	-.133	-.126	-.106	-.096	-.065
CG Demands	.248*	.187	.162	.146	-.063
CG Satisfaction[t]	-.247*	-.193	-.185	-.150	-.033
CG Physical Efficacy	.043	.009	.016	.027	.062

Note: Beta weights below the bold line represent variables not yet in the equation. T1 = measured prior to hospital discharge; RI = Recovering individual; CG = Caregiver (partner). [t] trimmed score (next lowest score substituted for two lowest scores). *$p < .05$.

entered on the first step, but did not make a significant contribution to the explained variance in partners' emotional distress (R^2 = .03). Table 18 presents the summary of this regression analysis.

In general, partner characteristics (27%), dyad characteristics (10%), and contextual factors in convalescence (10%) each contributed significantly to the explained variance in partners' emotional distress. Neither characteristics of the recovering individual nor the convalescent-phase outcome scores achieved by the recovering individual explained a significant amount of variance in the partners' emotional state. Altogether the five sets of predictors explained 60% of the variance in partners' total mood disturbance (adjusted R^2 = .50).

Beta weights for caregiving optimism, health, mutuality, and satisfaction were significant across the steps of the analysis. Large shifts in the beta weights for recovering individual physical efficacy and caregiving demands occurred when the set of caregiver characteristics entered the equation. Large shifts in the beta weights for surgical procedure, recovery demands and caregiving satisfaction occurred when the set of contextual factors entered the equation. At the last step of the equation, caregiver optimism, health, mutuality and recovering individual emotional distress had significant, negative beta weights; caregiving demands had a significant positive beta weight. The beta weight for recovering individual emotional distress changed progressively over the course of the analysis (step 1 β = .072 and at the final step β = -.203). Table 19 demonstrates shifts in the beta weights in this regression analysis.

Residual analysis. Residual analysis revealed four cases beyond ± 2 standard errors of the estimate and no cases beyond ± 3 standard errors of the estimate. The scatter diagram of standardized predicted versus standardized

Table 18

Partner Emotional Distress Multiple Regression Summary, (N = 91)

Step	Variable	R^2 Change	Sig Change	R^2	Adj R^2	F(Eqn)	Sig F	β weight at last step
1	**Surgical Procedure**[a]	.029	.088	.029	.019	2.971	.088	.108
2	**RI Characteristics**	.082	.129	.110	.055	1.980	.076	
	Optimism, T1							.042
	Residual optimism							.061
	Age							-.019
	Gender[b]							.052
	Illness severity							.086
3	**CG Characteristics**	.269	<.001	.379	.312	5.619	<.001	
	Health							-.212*
	Emotional distress, T1							.138
	Mean optimism							-.198*
	Age							.059
4	**Dyad Characteristics**	.096	<.001	.475	.405	6.790	<.001	
	RI Mutuality[t]							-.060
	CG Mutuality[t]							-.208*
5	**Contextual Factors**	.096	.008	.571	.479	6.220	<.001	
	RI Demands							-.176*
	RI Satisfaction[t]							-.176*
	RI Physical efficacy							-.139
	CG Demands							.282*
	CG Satisfaction[t]							-.101
	CG Physical efficacy							.055
6	**RI Outcomes**	.023	.101	.595	.496	6.015	<.001	
	RI Activity							-.054
	RI Emotional distress							-.203*

Note: RI = Recovering Individual; CG = Caregiver (partner). Sig Change = Significance of change (two-tailed); Adj = Adjusted; Eqn = Equation; Sig F = Significance of F test. [a]Surgical Procedure: 0 = valve or combined procedures; 1 = CABS only. [b]Gender: 0 = Female, 1 = Male. [t]trimmed score (next lowest score substituted for two lowest scores). *$p < .05$.

Table 19

Changes in Beta Weights at Each Step of Regression Analysis for Partner Emotional Distress, (N = 91)

Predictors	Corr. with Emotional Distress	Step 1 β weights	Step 2 β weights	Step 3 β weights	Step 4 β weights	Step 5 β weights	Step 6 β weights
1. Surgical procedure[a]	.169	.169	.173	.078	.054	.119	.108
2. RI characteristics							
Optimism, T1	-.114	-.082	-.084	-.010	.046	.080	.042
Residual Optimism	-.031	-.034	-.006	.078	.104	.060	.061
Gender[b]	-.175	-.185	-.158	-.104	-.089	.031	.052
Illness severity	.211*	.188	.102	.145	.171	.099	.086
Age	.144	.182	.153	.102	.060	.047	.019
3. CG characteristics							
Optimism	-.477*	-.463	-.465	-.339	-.224	-.178	-.198*
Health	-.392*	-.373	-.342	-.196	-.236	-.217	-.212*
Age	.106	.105	-.059	-.045	-.030	.029	.059
Emotional distress, T1	.372*	.371	.342	.189	.183	.154	.138
4. Dyad characteristics							
RI Mutuality[t]	-.341*	-.328	-.318	-.196	-.021	-.041	-.060
CG Mutuality[t]	-.438*	-.428	-.423	-.338	-.327	-.205	-.208
5. Contextual Factors							
RI Demands	.116	.113	.038	-.033	-.075	-.226	-.176
RI Satisfaction[t]	-.274*	-.297	-.254	-.175	-.117	-.106	-.176
RI Physical efficacy	-.308*	-.287	-.237	-.135	-.115	-.128	-.139
CG Demands	.441*	.482	.463	.366	.289	.303	.282*
CG Satisfaction[t]	-.341*	-.333	-.339	-.255	-.131	-.091	-.101
CG Physical efficacy	-.043	-.045	-.017	.053	-.041	.020	.037
6. RI Outcomes							
Activity	-.192	-.223	-.138	-.131	-.126	-.036	-.054
Emotional distress	.068	.072	.013	-.066	-.126	-.199	-.203*

Note: Beta weights below the bold line represent variables not yet in the equation. T1 = measured prior to hospital discharge; RI = Recovering ndividual; CG = Caregiver (partner); [t] = trimmed score (next lowest score substituted for two lowest scores). [a]Surgical procedure: 0 = valve or combined procedures; 1 = CABS alone. *$p < .05$.

residual scores produced a cloud of points with a pattern suggesting heteroscedasticity. There was more error observed in the prediction of high total mood disturbance. The normal probability plot of the standardized residuals suggested only minor deviation from normal. Based on the residual analysis, the statistical assumption of normality does not appear to have been violated. The assumption of constant error variance appears to have been violated. Figure 2 is a reproduction of the scatter diagram of standardized residuals with standardized predicted partner emotional distress.

Contribution of missing predictors. To test the significance of missing predictors the multiple regression analysis was repeated entering the predictors in the same order. One additional variable, number of missing predictors, was entered as a final step. The number of missing predictors did not contribute significantly to the explained variance (R^2 change = .01, p = .15).

Content Analysis

Recovering individuals were asked 4 open-ended questions related to their experience in convalescence: (a) Considering everything involved in convalescence after cardiac surgery, what things were most difficult for you? (b) Considering everything involved in convalescence after cardiac surgery, what things were most satisfying to you? (c) Were there specific actions you performed or things you did that you believe made a difference in the convalescent experience? If so, what were those things and how did they make a difference? (d) Is there anything else about your experience in convalescence that you would like me to know?

Responses to these questions were transcribed verbatim and subjected to content analysis. The unit of analysis was a phrase containing a specific

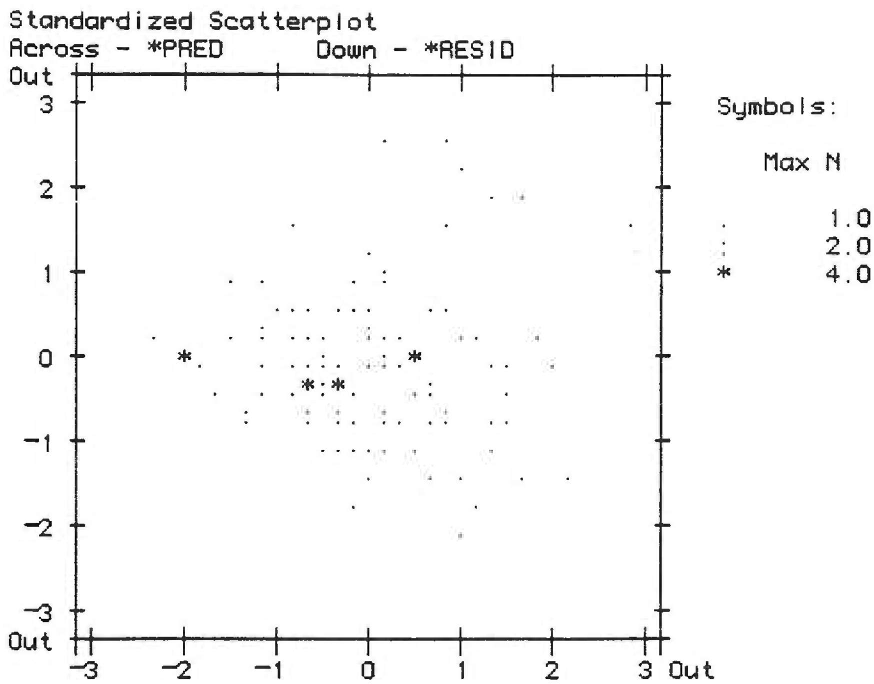

Figure 2. **Scatter Diagram Standardized Residuals by Standardized Predicted Partner Emotional Distress.**

response to the question. Responses frequently contained more than one phrase and were coded in more than one category. Categories for classification were identified after carefully reading the responses. The data and categories are summarized in Table 20.

The most frequent category of difficulty was physical sequelae including activity limitations, sleep disturbance, pain, physical depletion, appetite disturbance, respiratory problems, vision disturbance, and problems with medications. The next most frequent caregories of difficulty were cognitive/emotional disturbance and role changes.

Table 20

Summary of Content Analysis: Recovery Overall

Question	Recovering Individual	Partner
1. Considering everything involved in convalescence after cardiac surgery, what things were most difficult for you?	Physical sequelae (101) Activity limitations (31) Sleep disturbance (14) Pain (13) Physical depletion (10) Appetite disturbance (8) Breathing problems (6) Visual disturbance (4) Medication problems (3) Dysrhythmias (3) Other physical problems (9) Cognitive/Emotional Sequelae (15) Memory problems (2) Other (13) Role change (13)	RI's physical sequelae (19) Worrying (9) Role change (8) Not difficult (8) RI's Cognitive/Emotional Sequelae (7) Feelings of uncertainty, inadequacy or helplessness (7) Monitoring/Enforcing (6) Slow Progress (5) Increased tension in relationship (4) Lifestyle change (3) Sleep disturbance (2) Direct care (2) Personal health problems (2) Role conflict (1)
2. Considering everything involved in convalescence after cardiac surgery, what things were most satisfying to you?	Progress in recovery (43) Surgical outcomes (36) Support from others (excluding partner) (30) Partner's role enactment (10) Own role enactment (2)	Progress in recovery (41) RI role enactment (16) Surgical outcomes (12) Support from others (7) Perceived effect on relationship (4) Own role enactment (3) Not satisfying (2) Future plans (1)
3. Were there specific actions you performed or things you did that you believe made a difference in the convalescent experience? If so, what were those things and how did they make a difference?	Exercise/Activity (27) Positive mental attitude (11) Followed Dr.'s orders (7) Rest (1) Other (14)	Emotional support (23) Direct care (18) Being there (13) Avoiding conflict (5) Other (9)
4. Considering everything involved in convalescence after cardiac surgery did you feel adequately prepared for the experience?	Not asked.	Affirmative (55) Negative (17) Other (7)

CHAPTER 5

Discussion and Conclusions

This discussion of the study results begins with a brief discussion of sample characteristics in relation to other studies of recovery after cardiac surgery. The major part of the discussion focuses on individual and interactive factors in convalescence and gender differences found in this study. Issues related to the validity of the findings are presented. Implications for theory, practice and research conclude this section.

Meaning of Results

Sample Characteristics

A description of the sample generating the data provides a frame of reference for the findings to be discussed. This sample of 107 dyads was similar to those reported by Gilliss (Gilliss, 1984; Gilliss et al., 1993), Gortner (Gortner et al., 1988; Gortner & Jenkins, 1990) and Rankin (Rankin, 1990; Rankin, 1992; Rankin & Monahan, 1991) and their colleagues with regard to social status variables, illness severity and surgical procedures. Subjects in this sample were, however, significantly older than subjects in these published studies. Table 21 places this sample within the context of published studies of recovery after cardiac surgery.

The majority of dyads were well-educated, retired, male recovering individuals with their female partners convalescing after a first cardiac surgery. A significant minority of recovering individuals (19%) had one or two previous cardiac surgeries, and 5% of the partners had previous cardiac surgery. More than half (56%) of the recovering individuals had a history of a myocardial

Table 21

Sample Characteristics in Studies of Recovery after Cardiac Surgery

Study	Sample	Age	Illness Severity	Procedure
Levine, 1993	81 male patient/female partner dyads 26 female patient/male partner dyads.	*M* = 71.5 years for patients (range 63 to 82) *M* = 69.7 years for partners (range 49 to 84)	NYHA class I, 5%; class II, 33%; class III, 14%; class IV, 16%; missing, 33%. LVEF: normal, 43%; mild impairment, 14%; mod. impairment, 11%; severe impairment, 0.9%.	First or repeat CABS with or without defibrillator implant, 69%; first or repeat CVR, 21%; or combined CVR and CABS, 10%.
Allen, Becker & Swank, 1990	125 males	*M* = 54 years (range 35 to 65 years)	CCVSC class I, 11% class II, 41%; class III, 32%; class IV 16%; Average LVEF = 61% (± 15%0).	First, isolated CABS
Allen, Becker, & Swank, 1991	55 male patient/spouse dyads; Subgroup of first study.	*M* = 54 years for patients (range 38 to 65).	Mean preoperative LVEF, 63%.	First, isolated CABS
Brown & Rawlinson, 1976	87 males; 63 females; 11% attrition from contact to data collection.	48.2 years (range 25 to 64)	NYHA class I, 58%; class II, 32%; class III, 10%; class IV, 0%.	First CVR.
CASS principal investigators and their associates, 1983	780 subjects, 90.3% male	*M* = 51.2 years (*SD* = 7.4)	CCVS class I or II; excluded subjects age ≥ 65 years and those with coexisting chronic illness.	First, isolated CABS
Gilliss, 1984	71 patient/spouse dyads, 86% male patients enrolled; 41 patient/spouse dyads completed	*M* = 59 years for male patients; *M* = 63 years for female patients	74% elective surgery; 26% 2 vessel disease; 47% 3 vessel disease; 23% 4 vessel disease.	First, isolated CABS
Gilliss, Gortner, Hauck, Shinn, Sparacino, & Tompkins, 1993	156 patients and their primary caregivers; final sample = 149 dyads. 80.1% male patients; 5% attrition over 24 weeks.	*M* = 59.5 years (range 25 to 75 years)	NYHA class I, 18%; class II, 37%; class III, 28%; class IV, 18%.	CABS, redo CABS or cardiac valve replacement

(Table continues)

Table 21

Sample Characteristics in Studies of Recovery after Cardiac Surgery

Study	Sample	Age	Illness Severity	Procedure
Gortner, Gilliss, Shinn, Sparacino, Rankin, Leavitt, Price, & Hudes, 1988	79 patient/spouse dyads enrolled, 67 dyads completed; 80.6% male patients. 15% attrition over3 months.	*M* = 61.5 years	NYHA class I & II, 66%; class III & IV, 34%.	CABS, CVR, combined CVR + CABS
Gortner & Jenkins, 1990	156 patients together with family members enrolled; 149 completed. 80.1% male patients; 5% attrition over 24 weeks.	*M* = 59.2 years for male patients; *M* = 57.0 years for female patients.		CABS, redo CABS or cardiac valve replacement
Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983	318 patients; 84.3% male; 13% attrition over 6 months.	*M* = 54.4 years (range 32 to 69 years)	No severe illness of other organ system; not in ICU preoperatively.	First CABS
Jenkins, Stanton, Savageau, Ockene, Denlinger, & Klein, 1983	89 patients; 14% attrition over 6 months.	Age ranged from 25 to 69 years; *M* = 62.4 for combined procedures; *M* = 54.6 for CVR alone.	As above.	CVR or CVR + CABS
Kos-Munson, Alexander, Hinthorn, Gallagher, Goetze, 1988	92 patients; 84% male; 13.2% attrition over 1 year.	*M* = 55 years (range 35 to 64 years)	Subjects described as representative of patients undergoing CABS at that center.	CABS not described further
O'Connor, 1983	30 male patients	*M* = 55.5 years (*SD* = 6.6)	3 months post CABS enrolled in cardiac rehabilitation program	First CABS
Rankin, 1990	117 patients; 79.5% male		NYHA functional class	
Rankin & Monahan, 1991	117 patient/spouse dyads; 79.5% male patients; 70 dyads at 3 months, 40% attrition.	*M* = 60.1 years for patients (range 25 to 81 years); *M* = 58.3 years for spouses.	Used post-operative NYHA classification as indicator of cardiac recovery.	74% CABS; 23% CVR

(Table continues)

Table 21

Sample Characteristics in Studies of Recovery after Cardiac Surgery

Study	Sample	Age	Illness Severity	Procedure
Rankin, 1992	117 patient spouse dyads; 70 dyads 3 months later; 44 dyads 1 year later.	See previous study.	See previous study.	See previous study.
Scheier, Magovern, Abbott, Matthews, Owens, Lefebvre, & Carver, 1989	51 male patients	*M* = 48.5 years	Using criterion of 50% occlusion, 31% had single vessel disease, 47% two vessel disease, 18% 3 vessel disease.	First CABS

Note: NYHA = New York Heart Association; CCVS = Canadian Cardiovascualar Society ; CABS = Coronary Artery Bypass Surgery; CVR = Cardiac Valve Replacement; LVEF = Left Ventricular Ejection Fraction.

infarction. Thus, for the majority of dyads, this was not an initial exacerbation of their cardiac illness.

Individual and Interactive Factors in Convalescence

The overall purpose of this study was to examine the role of selected individual and dyad characteristics in convalescence after cardiac surgery in people 65 years of age and older. Specific aims of the study were (a) to examine the relative importance of recovering individual characteristics, partner characteristics, dyad characteristics, and contextual factors in convalescence in explaining convalescent-phase outcomes for the recovering individual; and (b) to examine the relative importance of recovering individual characteristics, partner characteristics, dyad characteristics, contextual factors in convalescence, and convalescent-phase outcomes achieved by the recovering individual in explaining convalescent-phase outcomes for the partner.

Figure 3 depicts the results of the study related to the specific aims. The model tested explained 47% of the variance in the recovering individual's activity status, 44% of the variance in the recovering individual's emotional distress, and 60% of the variance in the partner's emotional distress 3 months after cardiac surgery. The relative importance of each set of predictors varied with the outcome being explained. The most important predictor of the recovering individual's activity was the set of recovering individual characteristics (36%), with the set of contextual factors in convalescence explaining an additional 6% (not statistically significant) of the activity variance. The most important predictors of the recovering individual's emotional distress were the sets of recovering individual characteristics (16%) and of contextual factors in convalescence (20%). Similarly, the most important predictor of the partner's emotional distress

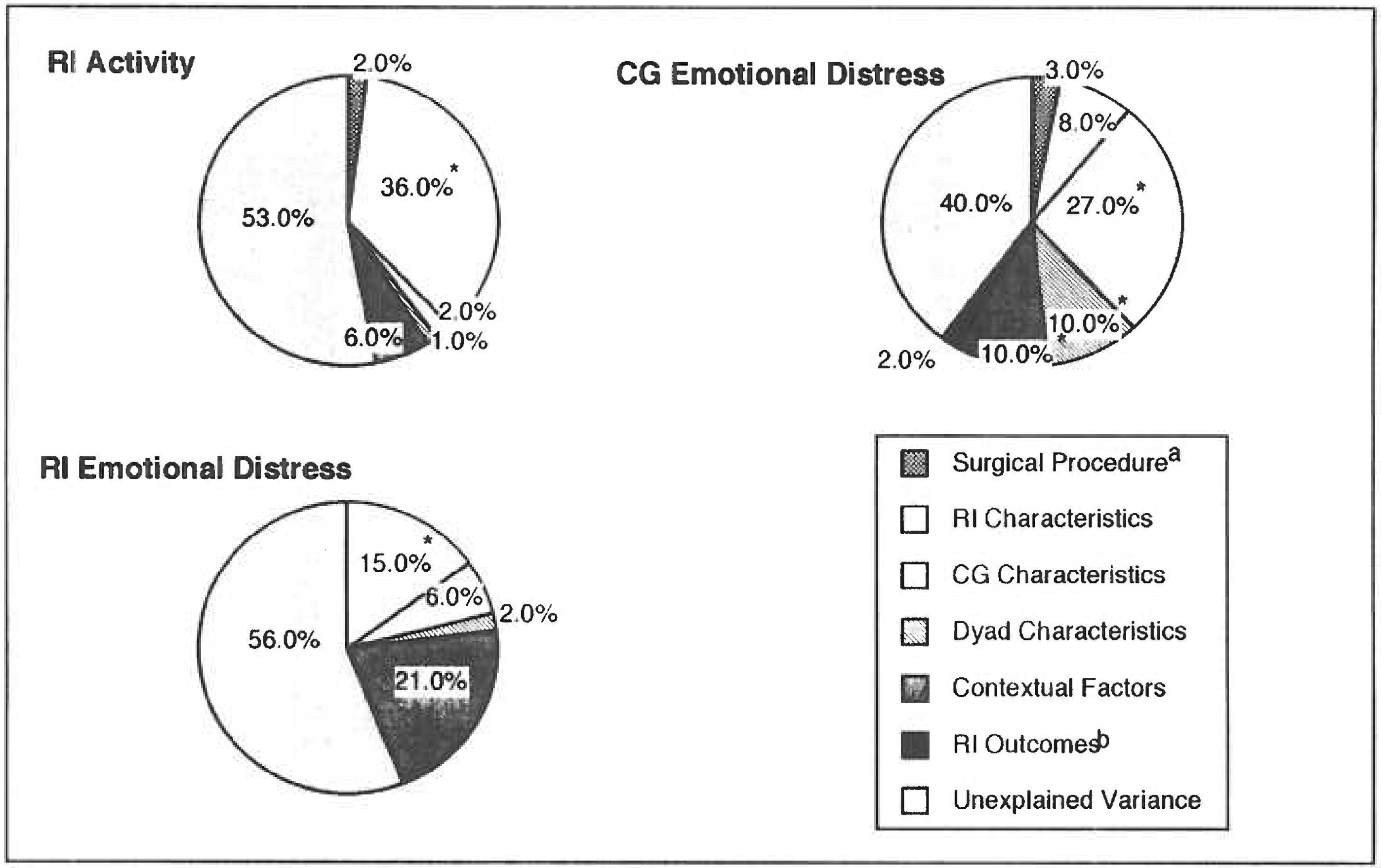

Figure 3. **Predictors of Recovering Individuals' Activity, Emotional Distress, and Partners' Emotional Distress.** *Note:* [a] and [b] are not predictors for RI emotional distress; [b] is not a predictor for RI Activity. *$p < .05$.

was the set of partner characteristics (27%), with the sets of dyad characteristics, recovering individual characteristics, and contextual factors in convalescence each contributing approximately 10% to the explained variance. Thus, for all three outcomes individual characteristics were most important, but characteristics of the partner and dyad as they interact during convalescence also influenced the convalescent-phase outcomes. Interactional factors (partner characteristics, dyad characteristics, and contextual factors in convalescence) were more important as predictors of emotional distress than they were as predictors of activity status.

Predictors of Activity Status

Illness severity. The most important single predictor of activity status 3 months after cardiac surgery was preoperative illness severity. The index of illness severity included an assessment of preoperative activity status, activity limitation due to cardiac illness (NYHA classification), and number and severity of coexisting conditions. Each of the component scores was associated significantly with activity status 3 months after surgery (r = .50, -.34, and -.38 respectively). Both the NYHA classification (r = -.36) and the number and severity of coexisting conditions (r = -.22) were also associated significantly with preoperative activity status. The NYHA classification was more highly correlated with preoperative than with postoperative activity. Less activity limitation due to cardiac symptoms would be expected after surgery and the pattern of associations supports the use of an index. Although this index of illness severity has not been used in other studies, similar findings have been reported by other investigators. The set of age, sex, type of surgery, and NYHA functional class explained approximately 10% of the variance in activity 3 months after cardiac surgery (Gilliss et al., 1993), while coexisting chronic illnesses predicted perioperative morbidity and length of hospital stay in cardiac surgery patients (Jollis, 1991). Prehospitalization health status was a significant predictor of discharge home versus discharge to a nursing home in older adults hospitalized for an acute illness (Lamont, Sampson, Matthias, & Kane, 1983) and of 6-month survival in older adults admitted to an intensive care unit (Le Gall, et al., 1982).

Nonsignificance of physical efficacy. In the current study, physical efficacy measured at hospital discharge was not a significant predictor of activity status measured 3 months after surgery. The zero-order correlation between the physical efficacy score of the recovering individual and 3-month activity status was not significant ($r = .16$, $p = .11$), but the association between physical efficacy of the partner and activity of the recovering individual was significant ($r = .20$, $p = .04$). Physical efficacy as reported by the recovering individual was significantly higher than that reported by the partner ($t_{100} = -5.88$, $p < .001$). Neither physical efficacy as reported by the recovering individual nor as reported by the partner was a significant predictor of activity status in multiple regression analysis. In contrast, other investigators reported that physical self-efficacy explained 20 to 35% of the variance in activity 2 to 6 months after cardiac surgery (Allen et al., 1990; Gortner & Jenkins, 1990; Ruiz, Dibble, Gilliss, & Gortner, 1992).

Possible explanations for the discrepant findings in the current study related to physical efficacy and activity compared to these published studies include time of measurement, method of measurement, sample differences, and social constraints. In some studies self-efficacy at hospital discharge was used to predict activity at 6 months (Allen et al., 1990); while in other studies, self-efficacy at 4 or 8 weeks was used to predict activity at 3 or 6 months (Gilliss et al., 1993; Gortner & Jenkins, 1990; Ruiz et al., 1992). Temporal disparities in measurement among the studies might be important because the perception of efficacy is sensitive to new information. Self-knowledge of one's efficacy, whether accurate or faulty, is based on four principal sources of information: actual performance, vicarious experience, verbal persuasion, and physiological state. Actual performance provides the most influential source of efficacy information because it is based on authentic mastery experience. In the current study physical efficacy was measured before hospital discharge, recovering individuals had not had an opportunity to attempt many of the activities about which they were questioned. Furthermore, the relationship between self-efficacy and activity is most accurate when they are measured in close temporal proximity (Bandura, 1986). It may be that recovering individuals' experiences when attempting activities early in convalescence altered their perception of efficacy.

In general, at the time of hospital discharge, recovering individuals scored higher on optimism, mutuality, and physical efficacy than partners did. The pattern of high scores on measures of positive psychosocial concepts suggests a response bias. Subjects may have been responding from a general sense of well-being related to surviving a life-threatening event and hope for the future, or the investigator's presence and affiliation with the health care system may have induced social desirability. On the other hand, although scores were high on measures of the three concepts, the correlation coefficients for paired concepts were not significant (optimism with efficacy, $r = .07$, $p. = 51$; optimism with mutuality, $r = .16$, $p = .11$; mutuality with efficacy, $r = .09$, $p = .35$) arguing against response bias.

Differences in measurement may explain the discrepant findings related to physical efficacy and activity in the current study compared with that of Gilliss and colleagues. In the current study, a single physical efficacy score reflected perceived ability to perform a variety of activities. This composite physical efficacy score was used to predict overall activity. In contrast, Gilliss and colleagues used a microanalytic approach in which subjects' degree of confidence in the ability to perform a specific activity was used to predict performance of that activity (Gilliss et al., 1993). While these differences could explain the discrepant findings in the current study compared with those of Gilliss and colleagues, they do not explain differences with other published studies or the association of the partner's composite physical efficacy score and the recovering individual's activity status.

Although differences in sample characteristics might be an explanatory factor, the primary difference in sample characteristics between the subjects in this study and published studies is the older age of subjects in the current study. Bandura indicates that older adults may misattribute socially induced changes in stamina to physiological aging, resulting in reduced efficacy (Bandura, 1986). However, subjects in the current study were subjectively robust and reported high physical efficacy scores. Thus, age does not offer an adequate explanation.

Social constraints may have acted to weaken the relationship between efficacy perceptions and activity status of the recovering individual. The partner's lower expectations, together with the surgeon's constraints on lifting and driving, may have constrained the recovering individuals' activity.

Predictors of Recovering Individuals' Emotional Distress

In general, very low levels of mood disturbance were reported by recovering individuals in this study. The level of mood disturbance was less than that reported in younger patients recovering from cardiac surgery (Rankin, 1988; Rankin, 1992; Rankin & Monahan, 1991), college students (McNair et al., 1981), and a sample of older adults (Kaye et al., 1988). Although the mean scores were low (M = 1.50), significant variability was present (SD = 20.35), indicating that convalescence was accompanied by significant emotional distress for some subjects. Total mood disturbance scores may have been attenuated by social desirability, which was not measured in this study. Social desirability has been reported to be a major correlate of the POMS total mood disturbance score in college students (r = .39) (Horowitz, Adler, & Kegeles, 1988) and of anger/hostility and depression/dejection in older adults (B. J. Stewart, personal communication, August, 1993).

Despite low levels of mood disturbance, optimism, recovery demands, and satisfaction in recovery were significant predictors of emotional distress for recovering individuals (final beta weights = -.176, .219, and -.395 respectively). Those who reported more optimism also reported fewer demands and more satisfaction in recovery. This pattern of association indirectly supports the theorized relationship between the meaning assigned to surgery and the response to surgery. It also supports Scheier and Carver's position that optimism may affect physical well-being through the appraisal of stressors and the selection of coping behaviors (Scheier & Carver, 1987).

Predictors of Partners' Emotional Distress

Partners' emotional distress was also very low, but showed a large amount of variability. Significant predictors of emotional distress for partners included both expected (i.e., personal health [β = -.212], optimism [β = -.198], mutuality [β = -.208], satisfaction in recovery [β = -.176], and caregiving demands [β = .282]) and unexpected associations (i.e., demands in recovery [β = -.176] and emotional distress of the recovering individual [β= -.203]). The unexpected associations indicate that when recovering individuals reported more recovery demands and more emotional distress, partners reported less emotional distress.

As in the current study, personal health, mutuality, and caregiving strain have been shown to be related to emotional distress in studies of family caregiving to frail older adults. For family caregivers, more mutuality was associated with lower demands of caregiving (r = -.28, p = .007) and with more satisfaction in the caregiver role (r = .28, p = .007) (Archbold et al, 1990). Similar relationships were demonstrated in the current study, more mutuality was associated with fewer demands of caregiving (r = -.29, p < .01) and with more satisfaction in the caregiving role (r = .32, p < .01). For the partner, optimism was significantly associated with mutuality (r = .34, p < .01); more optimism was also associated with fewer demands of caregiving (r = -.21, p = .03), but was not associated with satisfaction in the caregiving role.

Mutuality refers to the perceived positive quality of the relationship and has not been measured in published studies of recovery after cardiac surgery. Mutuality scores in the current sample were higher than mutuality scores in samples of family caregivers (Archbold et al., 1990). Higher mutuality scores in the current study may be due to differences in the kind of relationship or in the caregiving situation. In Archbold and colleagues' study, family caregivers included wives, husbands, daughters, sons, daughters-in-law, and friends and mutuality scores ranged from 1.67 to 4.00 ($M = 3.24$, $SD = 0.54$). Care recipients had been discharged from the hospital and required assistance with medications, activities of daily living, or instrumental activities of daily living. Caregiving was ongoing and mutuality decreased slightly from 6 weeks to 9 months. In the current study, dyads were composed primarily of husbands and wives temporarily cast in the roles of caregiver and care receiver with expectations for future good health.

The negative association of recovery demands and emotional distress of the recovering individual with emotional distress of the partner was puzzling. These associations may be explained, in part, by the partner's perception of the caregiving situation. It may be that the caregiving role is seen as temporary and the caregiving situation as containing the promise of a better future. One partner commented that she was doing okay so far, but realized she would need to make major lifestyle changes if caregiving was a permanent role. Perhaps perceiving the role as temporary, partners feel challenged by caregiving and enjoy the opportunity to express concretely their caring. In addition, the most frequently expressed satisfier for both the recovering individual and partner was the progress made in recovery. Progress may be more easily recognized in a context of high recovery demands.

Gender Differences

Clinical scientists have begun to recognize that the presentation and experience of heart disease is different for men and for women. Despite efforts made in the design of this study to include female recovering individuals and male partners, the majority (80%) of dyads was comprised of a male recovering individual and female partner. More women than men were excluded from the pool of potential subjects due to the absence of a partner.

Biophysical differences. Preoperatively, female recovering individuals were less active and reported more activity restriction due to cardiac symptoms (higher NYHA class) than did male recovering individuals. The presence of comorbid conditions including previous myocardial infarction, congestive heart failure, peripheral or cerebrovascular disease, chronic obstructive lung disease, and diabetes did not differ by gender. Surgical procedure did not differ by gender, although patients having repeat surgeries were more likely to be male. Female recovering individuals had fewer perioperative complications and shorter lengths of stay in intensive care. Males and females did not differ in the incidence of atrial dysrhythmias, but only males experienced ventricular dysrhythmias or heart block. Female recovering individuals reported less activity 3 months after surgery than male recovering individuals did. Rankin also found that women had more activity limitation due to cardiac symptoms than men did at the time of surgery. However, she found that women had longer intensive care unit stays than men, that proportionately more women died in surgery and during the first six weeks after surgery, and that their were no significant differences in activity 3 months after surgery (Rankin, 1990).

Psychosocial differences. Female recovering individuals reported lower physical efficacy, but males and females did not differ in optimism, perceived mutuality, strain or satisfaction in the recovering role, or emotional distress 3 months after surgery. In Rankin's study, female patients reported significantly less total mood disturbance than male patients did 3 months after surgery.

Although age of the recovering individuals did not differ significantly by gender, male partners were significantly older than female partners ($t_{29.14}$ = -3.98, $p < .01$). That male partners tended to be older than female partners is not surprising because the onset of symptomatic heart disease occurs approximately 10 years later in women than it does in men, and women in this age cohort tended to marry older men.

In addition to being older, male partners reported more demands and difficulty in caregiving. The association between partner gender and caregiving strain remained significant when age was statistically controlled (gender with caregiving demands after partialling out age, semipartial $r = .32$; gender with caregiving difficulty after partialling out age, semipartial $r = .27$). Although female recovering individuals reported less activity at 3 months, there were no gender differences for physical efficacy, recovery demands or difficulty, or emotional distress among recovering individuals. Thus, the strain experienced by male partners does not appear to be due to female recovering individuals experiencing more problems in convalescence or to the older age of male partners. It appears that being in the caregiving role during convalescence from cardiac surgery may be more difficult for men than for women.

Greater difficulty for male partners conflicts with published findings with younger cardiac surgical patients and the general finding in family caregiving. Among younger cardiac surgical patients and their partners, male partners reported less involvement in caregiving, less burden, and less emotional distress 3 months after surgery (Rankin, 1988; 1992). In studies of family caregiving, those that control for differences in the physical and cognitive functioning of the care recipient have not found significant gender differences in caregiver burden

(Zarit, Todd, & Zarit, 1986). In comparison with the younger male partners in Rankin's study, male partners in the current study may have been more involved in caregiving due to being retired and spending more time in the home, and thus reporting more caregiving demands.

Validity of the Findings

Evidence of the validity of a study can be inferred from statistical conclusion validity, internal validity, construct validity, and external validity (Cook & Campbell, 1979). These categories were identified specifically related to quasi-experimental studies, however many of the criteria are relevant to observational studies and will be used as a framework for evaluating these findings.

Statistical Conclusion Validity

The basic concern related to statistical conclusion validity is whether two variables behave in a way that can be observed statistically (Cook & Campbell, 1979). Major threats to statistical conclusion validity considered in the design and conduct of this study include inadequate power, violation of the assumptions of statistical tests, fishing and the error rate problem, and unreliability of measures.

Power. Low statistical power can increase the risk of failing to detect significant effects and thus threaten validity of the findings. Statistical power results from the interaction of sample size, effect size, alpha level of significance, precision of measures, and the power of statistical tests. In the current study, sample size was initially determined through a power analysis using a significance level of .05 and a power level of .80, as shown in detail in Table 2. This analysis indicated that a sample of 115 would be adequate in all but one contingency. Because of the nonsignificant findings for the major study hypotheses, a retrospective power analysis was conducted. Nonsignificant hypothesized relationships may represent either a true absence of covariation or inadequate power. In retrospective power analysis, the known variance and sample size are used to determine the magnitude of effect that could be detected with 95% confidence. If the magnitude of the detectable effect seems low, one can tentatively accept the null hypothesis. If the detectable effect seems high, it is not clear whether the absence of covariation represents a true absence of relationship or inadequate power (Cook & Campbell, 1979). The observed R^2-changes related to partner and dyadic characteristics in predicting activity in this study are very small and the null hypothesis can be provisionally accepted. In contrast, the effect of contextual factors in predicting activity is larger and the nonsignificant association may represent either a true absence of relationship or inadequate power. Similarly, the nonsignificant associations of partner characteristics with recovering individual's emotional distress and of recovering individual characteristics with partner's emotional distress may represent either a true absence of covariation or inadequate power. Thus these constructs should be retained for examination in subsequent studies. Table 22 summarizes the available power and detectable effect size for the nonsignificant, hypothesized relationships in this study.

A second concern related to inadequate power is that a large error term might reduce the ability to demonstrate an effect. The sample included patients who had experienced coronary artery bypass and cardiac valve surgery. As

Table 22

Retrospective Analysis of Power, $\alpha = .05$

Nonsignificant Hypothesized Relationships	Observed R^2-change	Approximate β	Detectable R^2-change*	N required for significance**
RI Activity status, ($n = 94$)				
Partner characteristics	.02	.30	.126[a]	332
Dyadic characteristics	.01	.10	.107[a]	495
Contextual factors	.06	.50	.153[a]	143
RI Emotional distress, ($n = 94$)				
Partner characteristics	.06	.50	.153[a]	154
Dyad characteristics	.02	.10	.107[a]	334
CG Emotional distress, ($n = 91$)				
RI characteristics	.08	.55	.131[b]	150
RI outcomes	.02	.10	.115[b]	214

Note: RI = Recovering individual; CG = Caregiver (partner). [a]Given $N = 94$, $\beta = .80$, $\alpha = 05$. [b]Given $N = 91$, $\beta = .80$, $\alpha = .05$. ** Given observed R^2 change, $\beta = .80$, $\alpha = 05$.

described above, Student's *t* tests were performed using a significance level of .25 to determine if the two groups were significantly different on the dependent variables. Because the groups were different on activity and partner emotional distress, surgical procedure was statistically controlled in those analyses.

Assumptions of statistical tests. Statistical assumptions underlying multiple regression analysis include a normal distribution in the population, uncorrelated errors, linearity, and homoscedasticity (Kleinbaum, Kupper, & Muller, 1988). These assumptions were assessed using descriptive statistics, histograms, scatter diagrams, and residual analysis. The only violation of an assumption that was detected was the finding of unequal error variance in the scatter diagram of standardized residuals with standardized predicted scores for partner emotional distress.

Multiple testing and the error rate. A large number of relationships were examined given the number of subjects included in this study. The problem of multiple testing and slippage of the error rate was controlled by testing only predicted relationships. Bonferroni's correction was employed when testing multiple secondary hypotheses.

Reliability of measures. Two potential threats exist within the area of measurement: (a) the use of new measures of the contextual factors in convalescence, and (b) the use of mixed methods (patient interview and survey) for data collection. Each of the new measures demonstrated an internal consistency reliability greater than .70, Nunnally's criterion for use of a new measure in research (Nunnally, 1978).

The decision to use a structured interview with the recovering individual at discharge was intended to minimize respondent burden and the problem of missing data and to increase the liklihood that the recovering individual and partner would respond individually. While the presence of the investigator may have induced social-desirability bias on measures of mutuality and optimism from the perspective of the recovering individual, there is no evidence that this occurred and there were few missing data from the recovering individual at time one. Although there is no direct evidence that dyads collaborated in responding to the 3 month survey, recovering indicividual and partner optimism scores were more highly correlated at 3 months ($r = .16$, *NS*) than they were at the time of hospital discharge ($r = .06$, *NS*). This suggests that the 3-month surveys may not have been completed individually.

Internal Validity

The major threats to internal validity present in this study were self-selection, mortality, and ambiguity about the direction of relationships (Cook & Campbell, 1979). An attempt was made to ensure that all people who met the sampling criteria were given an opportunity to participate in the study. Specific procedures were developed at the two larger centers to include patients having emergent surgery. While no provision was made for accessing emergency cases at the smaller center, subject recruitment from the smaller center was stopped after 7 months. The refusal rate of eligible subjects (24.7%) was not uncharacteristically high for studies of acutely ill cardiac patients and their families.

Attrition rate over the 3-month data collection period was 12%. This rate exceeded the predicted 6% and contributed somewhat to reduced power for analysis. Partners were less likely than recovering individuals to complete both phases of data collection. It may be that the convalescent experience and the investigation related to it was less salient for partners than for recovering individuals, that partners had more to do and felt more hassled during convalescence, or that because the investigator had more direct contact with recovering individuals than with partners a relationship may have been established that resulted in recovering individuals being more committed to completing the study.

Clearly, one can not attribute causation within a correlational design. Variables were entered into the regression analysis so that no variable entering later was a logical predictor of one entering earlier, however contextual factors in convalescence and the outcome variables were measured simultaneously and the direction of the relationships are not theoretically clear. Thus, it may be equally plausible that activity status or emotional distress contributed to strain and satisfaction in the recovering and caregiving roles as that strain and satisfaction predicted the outcome variables.

Construct Validity

Threats to the construct validity of this study include inadequate preoperational explication of the physical efficacy concept and the reliance upon self-report data. Physical efficacy was measured more globally than recommended by Bandura (Bandura, 1986). A microanalytic approach to measurement may have produced results comparable to those of other studies. Although self-report data is appropriate for studies of personal experiences conducted within an interaction framework, techniques less dependent on recall such as the use of diaries may have enhanced recall of events and responses during convalescence.

External Validity

The target population to which the investigator would like to generalize is the population of dyads over age 65 having cardiac surgery. Broad sampling criteria were employed to ensure representativeness of the sample. The three centers used draw patients from throughout western Washington. Nevertheless, the three centers are all teaching hospitals located in a major metropolitan area, random-sampling was not done, almost half of the potential subjects over the age of 65 years were excluded due to the absence of a partner, 25% of those eligible to participate refused, and 12% did not complete both phases of data collection.

Implications for Theory, Practice, and Research

Theory

The conceptual model used in this study proposed that characteristics of the recovering individual/partner dyad would influence convalescent phase outcomes directly and indirectly through contextual factors in convalescence. The statistical model used only tested direct relationships between sets of predictors and the outcome variables. This statistical analysis was used because of the exploratory nature of the study. Nevertheless, the findings support the basic theoretical notion that experiences of both the recovering individual and partner during convalescence influence the achievement of convalescent-phase outcomes. Contextual factors in convalescence explained 20% of the variance in recovering individual emotional distress, 10% of the variance in partner emotional distress, and 6% of the variance in activity status. Partner and dyad characteristics did not contribute significantly to the activity status of the recovering individual, but taken together explained 10% of the variance in emotional distress of the recovering individual. Figure 4 summarizes these relationships.

The theoretically important construct of the meaning of surgery to the recovering individual and partner was not assessed in this study. Although purposefully omitted, its absence limits interpretation of the results. Inadequate operationalization of the efficacy construct further limits the theoretical interpretation of this study.

Practice

Decision-making in the management of cardiovascular disease is often influenced by patient age and illness severity. Some clinicians believe that age and illness severity are inexorably linked. Concerns about health care costs have led to discussions about the appropriateness of surgical therapy for older adults with cardiac disease. Some have suggested advanced age as one criterion for withholding surgical therapy. In older adults, the goal of surgical intervention is not to increase the length but the quality of life. The results of this study indicate that in older adults with a partner surviving cardiac surgery and hospitalization, illness severity is a significant predictor of activity status while age is not. In addition, neither age nor illness severity were significant predictors of emotional distress for the recovering individual or partner. Thus, to the extent these outcomes reflect life quality, age should probably not be a major factor in decision-making related to the provision of surgical therapeutic options for the management of heart disease in older adults.

The results of this study indicate that, on the average, older patients and their partners do not experience excessive emotional distress or prolonged activity limitation after cardiac surgery. In addition, the results provide tentative

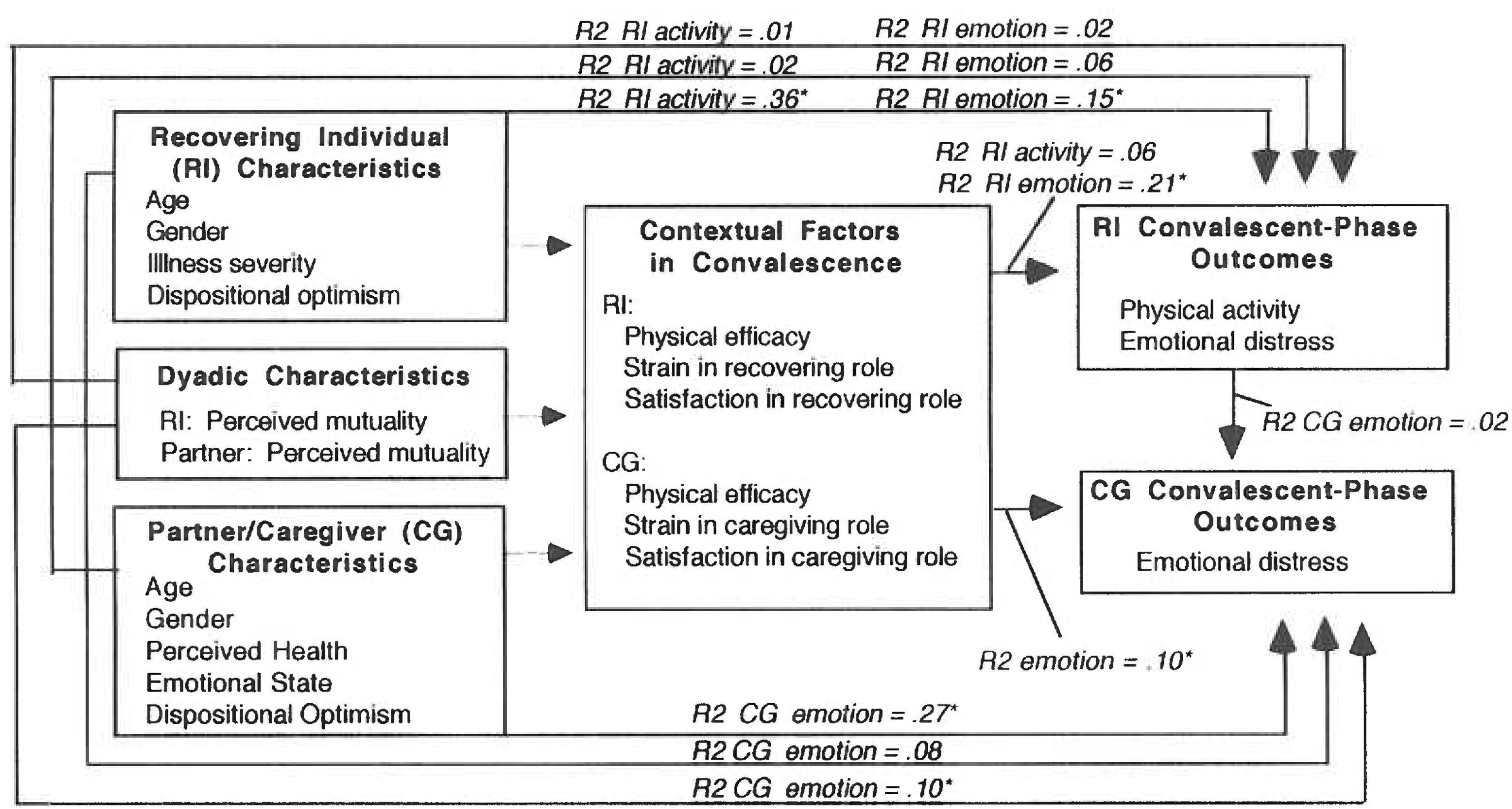

Figure 4. **Explained variance in convalescent-phase outcomes.** Note: Indirect relationships not tested.

evidence of the contribution of both the recovering individual and partner to the convalescent-phase outcomes achieved. Use of a practice model that includes the partner and the social environment of convalescence can guide nursing practice. Although acute-care nurses, in general, try to include the partner in their discharge planning, only 36% of the partners in this study indicated that they had attended a class in preparation for discharge. In this study, male partners of older, female recovering individuals reported more difficulty in convalescence than female partners did. Gender may be one factor to be considered in the preparation of partners for discharge and in making home health nursing referrals. In addition, preoperative illness severity was the best predictor of activity 3 months after surgery. The index of illness severity was composed of readily available clinical indicators and could also be considered in making home health nursing referrals. Home health nursing intervention may include assisting the recovering individual and partner with symptom management and using anticipatory guidance to reduce the partners' feelings of uncertainty and helplessness.

Research

Although the results of this study indicate that, on the average, older adults experience little emotional distress during convalescence the large standard deviations indicate that some individuals do experience large amounts of distress. Preliminary evidence has been obtained that may help to identify individuals at risk for difficulty in convalescence. This line of inquiry should be pursued.

The model of recovery tested had a large number of nonsignificant relationships. As parsimony is valued in research and a simpler model would be more relevant to clinical practice, it should be pursued. It appears that the predictors of emotional distress are similar for both the recovering individual and partner, but that the predictors of activity status are different. Identification of the best predictors of important outcomes would have direct applicability to nursing practice.

Why patients had such high scores on the psychosocial variables of physical efficacy, mutuality, and optimism at the time of hospital discharge is not clear. Perhaps the recent survival of a life-threatening event produced a general sense of well-being. If so, exploration of this sense of well-being, its duration and effect on the retention of information during the hospital phase may have implications for nursing practice.

Almost one-half of potential subjects aged 65 years or more were excluded from this study due to the lack of a partner. How the experience of older adults without a partner differs from those with a partner is unknown and could provide additional evidence about the partner's contribution to recovery.

While the model tested explained 47% of the variance in activity status, 44% of the variance in emotional distress of the recovering individual, and 60% of the variance in emotional distress of the partner, significant amounts of variance remain unexplained. One theoretically important construct that might explain additional variance is the meaning of illness to the recovering individual and partner. Review of outlying cases in the current study seems to indicate that emergent surgery and surgical complications may be important factors in a model explaining emotional distress. The presence of surgical complications and impaired cardiac function may be important in explaining postoperative activity status.

Two additional research questions invite further study. What is the relationship between experiences during convalescence and long-term adjustment after surgery? Does this model of recovery (or a revised model based on the results of this study) have relevance for recovery from acute exacerbation of other chronic illnesses?

Summary

This study focused on understanding the experience of older-adult dyads during the convalescent phase of recovery after cardiac surgery. Specifically, it assessed the relative contribution of characteristics of the recovering individual, partner, and dyad, and contextual factors in convalescence in explaining the variance in activity status and emotional distress of the recovering individual and the emotional distress of the partner 3 months after cardiac surgery. The conceptual model for the study was derived from interactive role theory (Stryker & Statham, 1985) and social cognition (Bandura, 1986; Scheier & Carver, 1987).

A nonexpiremental, longitudinal correlational design was used to test the study hypotheses:

1. Four sets of variables (characteristics of the individual, partner, and dyad and contextual factors in convalescence) will each contribute significantly to the explained variance in the activity status and emotional distress of the recovering individual 3 months after cardiac surgery.

2. Five sets of variables (characteristics of the partner, the recovering individual, and the dyad, contextual factors in convalescence, and the recovering individual's convalescent-phase outcomes) will each contribute significantly to the explained variance in the emotional distress of the partner at 3 months.

The final sample consisted of 86 male recovering individuals and their female partners and 21 female recovering individuals and their male partners. The sample was predominantly Caucasian and well-educated. Age of recovering individuals ranged from 63 to 82 years with a mean of 71.4 years ($SD = 4.1$ years) and the age of partners ranged from 49 to 84 years with a mean of 69.6 years ($SD = 6.9$ years). The majority of patients had coronary heart disease (72%), the remainder had valvular heart disease (21%) or combined coronary and valvular heart disease (7%).

Five standardized instruments were used to measure characteristics of the recovering individual, the partner, the dyad, and the convalescent phase outcomes. Three modified instruments were used to measure contextual factors in convalescence from the perspective of the recovering individual and partner. With the exception of the illness severity index and the activity status index, all scales had internal consistency reliability coefficients greater than .70. Single items were used to assess partner health and demographic characteristics of both the recovering individual and partner.

Activity status of the recovering individual 3 months after cardiac surgery was not significantly different than preoperative activity status. On the average, low levels of emotional distress were reported by both the recovering individuals and the partners.

Hierarchical multiple regression was used to test the primary hypotheses. For recovering individual activity status at 3 months, the contributions of each set of variables were as follows: (a) recovering individual characteristics, 36% ($p < .01$); (b) partner characteristics, 2% (*NS*); (c) dyad characteristics, 1% (*NS*);

and (d) contextual factors in convalescence, 6% (*NS*). Total explained variance was 47% (adjusted $R^2 = .36$).

For recovering individual emotional distress 3 months after surgery, the contribution of each set of variables was as follows: (a) recovering individual characteristics, 15% ($p < .01$); (b) partner characteristics, 6% (*NS*); (c) dyad characteristics, 2% (*NS*); and (d) contextual factors in convalescence, 21% ($p < .01$). Total explained variance was 44% (adjusted $R^2 = .33$).

For partner emotional distress at 3 months, the contribution of each set of variables was as follows: (a) recovering individual characteristics, 9% (*NS*); (b) partner characteristics, 27% ($p < .01$); (c) dyad characteristics, 10% ($p < .01$); (d) contextual factors in convalescence, 10% ($p < .01$); and (e) recovering individual convalescent-phase outcomes, 2% (*NS*). Total explained variance was 60% (adjusted $R^2 = .50$).

Although the findings do not entirely support the study hypotheses, they do support the theoretical contribution of the partner and contextual factors in convalescence to the explained variance in convalescent-phase outcomes. Limitations of the study include the exclusion of almost half of potential subjects over the age of 65 years due to the absence of a partner; inadequate preoperationalization of the efficacy construct; and the inclusion of a large number of nonsignificant relationships in the regression model. The conceptual model for this study postulated the existence of both direct and indirect effects of recovering individual, partner and dyad characteristics on convalescent-phase outcomes, however, due to the exploratory nature of the study, the statistical model tested only direct effects.

Implications of this study for practice include evidence that characteristics of both the recovering individual and partner, together with contextual factors in convalescence contribute to the explained variance in convalescent-phase outcomes. Thus, nursing intervention may be directed toward each of these factors. Despite the efforts of acute care nurses to prepare patients and partners for discharge, only 36% of the partners in this sample recalled having attended discharge preparation classes. Alternative ways of preparing dyads or of providing anticipatory guidance should be considered. Alternative methods might include home-computer interactive programs or referral to home health nursing services. Preoperative illness severity of the recovering individual and male gender of the partner are two factors that are associated with difficulty in convalescence and should be considered in making home health referrals.

While the model tested explained 47% of the variance in activity status, 44% of the variance in recovering individual emotional distress, and 60% of the variance in partner emotional distress, significant amounts of variance remain unexplained. One theoretically important construct omitted from the current study is the meaning of illness to the recovering individual and partner. Review of outlying cases in the current study indicates that emergent surgery and surgical complications may be important in a model explaining emotional distress. The presence of surgical complications and impaired cardiac function may be important in explaining postoperative activity. The questions of whether convalescent experiences predict long-term adjustment to cardiac illness and if this model can predict recovery after acute exacerbation of other chronic illnesses remains for subsequent investigation.

In this time of health reform and cost reduction, it is important to recognize that older adults in this study did not experience significant emotional distress or prolonged activity limitation after cardiac surgery. As has been previously reported in younger samples, older adults had regained their preoperative level of activity 3 months after surgery (Gilliss, 1993). The emotional distress experienced by older adults was less than that reported by younger adults after cardiac surgery (Rankin, 1991). In this study age was not a significant predictor of outcome, and the convalescent-phase outcomes achieved were comparable to those achieved in studies of younger people.

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LIST OF APPENDICES

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Appendix A

Summary Table of Research Cited in Literature Review

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Allen, J. K., Becker, D. M., & Swank, R. T. (1990). Factors related to functional status after coronary artery bypass surgery. *Heart & Lung, 19,* 337-343.	*Purpose:* 1. To explore the differences in patient's functional status before and during the first 6 months after CABS. 2. To identify the psycho-social and physical predictors of functional status after CABS. *Design:* Longitudinal, descriptive, correlational. Interview on the fifth post-operative day, with telephone interviews at 4 weeks and 6 months. *Theoretical framework:* Self-efficacy.	Convenience sample of 125 males, age ≤ 65 years. First by-pass, excluded subjects with presurgical, noncardiac disability that limited func-tional ability. Age: $M = 54$; *SD,* not reported; range 35-65 years.	Preoperative LVEF, number of bypass grafts, Cana-dian C-V society functional class, length of preoperative disability, postoperative ETT, LOS, number of co-existing conditions. Functional Status Ques-tionnaire - IADL, social/ leisure function, and mental health subscales; Self-efficacy measure based on FSQ subscales, used 5 and 6 point response options.	Coefficient alpha for subscales of FSQ: IADL= .65; Social/ leisure activity = .79; mental health = .85. Coefficient alpha for self efficacy mea-sures: ADL = .64; social and leisure activity = .91. The FSQ has been used with primary care patients. Psychometrics from previous studies are not reported.	Paired *t* tests were used to compare preoperative and 6-month postoperative functional status. PPM correlations between psychosocial and physical variables and two subscales of functional status. Stepwise MR: controlled preoperative level of function-ing; allowed the physical and psychosocial variables to enter automati-cally. Regressed IADL and Social / Leisure subscales on predictors.	Increased physical activity ($t = 9.10$, $p < .001$) and social/leisure function ($t = 5.93$, $p < .001$) from pre- to 6 months postoperative. Self-efficacy (partial $r = .45$, $p = .004$), preop. functional status (partial $r = .16$, $p = .18$), preop. mental health status (partial $r = .15$, $p = .20$), age (partial $r = .15$, $p = .22$), number of bypass grafts (partial $r = .11$, $p = .34$), postop. ETT (partial $r = .11$, $p = .37$), and postop. LOS (partial $r = .05$, $p = .68$) explained 30% of the variance in 6-month physical activity. Self-efficacy (partial $r = .49$, $p < .001$), ETT (partial $r = .29$, $p = .02$), age (partial $r = .17$, $p = .14$) and 4 other nonsignificant predictors explained 32% of the variance in social/ leisure functioning 6 months after surgery.	FSQ responses for social activity and IADLs are ordinal from 1 to 4. Mean scores are reported. Only 50% of subjects underwent postoperative ETT, thus sample size for multiple regres-sion analyses are quite small ($n = 51$; $n = 56$). Co-efficient alpha for IADL scale and ADL self efficacy were < .70. Sample limited to males, under 65.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Allen, J. K., Becker, D. M., & Swank, R. T. (1991). Impact of spouse concordance of psychological adjustment on functional status after coronary bypass surgery. *Journal of Nursing Quality Assurance, 5*, 69-74.	*Purpose:* 1. To examine psychological adjustment in spouse/patient pairs 1 month after CABS; 2. to examine the extent to which spouse/patient concordance of psychological adjustment predicts patient functional status at 6 months. *Design:* Longitudinal, descriptive, correlational. Patients interviewed on the fifth post-operative day, and by telephone 1 and 6 months postop. Spouses mailed survey at 1 mos. *Theoretical framework:* Not addressed. Self-efficacy from previous report.	From a convenience sample of 125 males, 58 patient/spouse pairs were interviewed at 1 month postoperatively and 55 pairs responded at 6 months. Mean age of patients = 54 years. All patients were male having their first CABS. All spouses were living together full time.	Physical, social, leisure activity, and mental health subscales of the FSQ were completed by the patients at 1 and 6 months. Mental health subscale of the FSQ was used to assess the frequency of anxiety and depression in both the patient and spouse at 1 month. IADL subscale of the FSQ at 6 months was used as the outcome measure.	FSQ is said to have "established reliability and validity". Reference is to its use in primary care. No specifics. In this sample, Cronbach's alphas ranged from .71 to .99 (Note, these coefficients are better than those reported for the larger sample of patients only, previous report.)	Psychological adjustment, scores were categorized as high or low by a median split. If both patient and spouse scored above the median --> concordant high, both below the median --> concordant low; one above and one below --> discordant. Simple linear regression was used to determine the extent to which each category individually predicted 6-month functional status. Stepwise MR analysis of predictors of 6-month physical functional status.	Patients' 6-month physical functional status scores were generally high (M = 85, SD = 20; range not reported); 14% experienced significant disability (score < 72). Patients' psychological adjustment scores were higher than spouses' scores (M = 80, SD = 16 versus M = 70, SD = 19). More spouses than patients had significant disability (35% versus 18%). There were more concordant (n = 40) than discordant (n = 15) pairs. In MRC analysis, concordant low psychological adjustment (β = .34, p < .02), age (β = .08, p < .58), chronic medical problems (β = .05, p < .71), and number of bypass grafts (β = .04, p < .80) explained 12% of the variance in physical functional status.	Predictor variables for MRC analysis were selected based on simple linear analyses. Concordant low adjustment was significant and used in MRC analysis. Thus, the MRC analysis is data driven. "Cut off" scores for significant psychological disability are different for patients and spouses without explanation calling into question the finding of more psychological distress among spouses. The relation of this subsample to larger sample is not explained.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Anderson, G. M., Newhouse, J. P. & Roos, L. L. (1989). Hospital care for elderly patients with diseases of the circulatory system: A comparison of hospital use in the United States and Canada. *New England Journal of Medicine, 321*, 1443-1448.	*Purpose:* To explore the similarities and differences in cardiovascular diagnosis and management for older persons in the US and Canada. The two comparison times allowed an assessment of the impact of DRG reimbursement on therapeutic management of CV diseases in older persons. *Design:* Comparison of two groups, both underwent acute hospitalization for cardiovascular illness. *Theoretical framework:* Epidemiological study.	Limited study to people 65 and older. Canadian data were analyzed for fiscal year (FY) 1981 and FY 1985 from the provinces of Manitoba and Ontario. The data were drawn from comprehensive sources of discharge information maintained by the provincial governments. US data came from a 20% sample of all hospital claims submitted to the Medicare program in FY 1981 and in FY 1985.	Examined rate of hospital discharges assigned to MDC 5 -- diseases and disorders of the circulatory system. The discharges in MDC 5 fall into 43 separate DRGs, 18 surgical and 25 medical.	Not addressed. Data can be presumed to be reliable as the source is governmental payment sources.	Compared overall discharge rates and trends in the US and Canada in 1981 and 1985.	Cardiovascular disease (CVD) among elderly patients in the US and Canada accounts for 25% of all hospital discharges. In 1981 and 1985, the overall discharge rates for CVD were very similar in the two countries showing a small ↑ over time. In both countries the average LOS ↓ between 1981 and 1985 with a more rapid ↓ in the US. Surgical cases accounted for 10-15% of discharges, but 25-35% of the case-mix units. Surgical cases showed a marked ↑ in the US relative to Canada. Canadian surgical rates ↑ 10% between 1981 and 1985, US rates ↑ by 64%. Average LOS in US for surgical CVD patients = 12.4 days. In Canada, the rate of CABS in patients >75 years ↑ 3-fold; the ↑ in the US was even more rapid.	Appears consistent with my understanding of epidemiological studies. The implied meaning of this study is that the introduction of DRGs in the US resulted in an increase in percentage of surgical C-V discharges among elders that was much greater than that seen in Canada. It is assumed that technical changes are equivalent between the two countries.

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Archbold, P. G., Stewart, B. J., Greenlick, M. R., & Harvath, T. (1990). Mutuality and preparedness as predictors of caregiver role strain. *Research in Nursing & Health, 13*, 375-384.	*Purpose*: To determine how well mutuality and preparedness explain the variance in caregiver role strain after controlling for common predictors of strain. *Design*: longitudinal, exploratory, correlational. *Theoretical framework* Interactional role theory.	78 dyads participated in 6-week and 9-month interviews. Caregivers (CG) were related to the care receivers (CR) as wives (19%), husbands (26%), daughters (21%), sons (6%), daughters-in-law (13%), other relatives (10%), or friends (5%). Median duration of caregiving = 1.5 years. CGs age ranged from 21-82 years (*M* = 63). CRs age ranged from 65 - 93 years (*M* = 78). (Note, attrition = 6% over 9 months.)	Predictor variables mutuality, preparedness, gender, spouse/ nonspouse, degree of cognitive and physical impairment of the CR, amount of direct care. Outcome variable(s): CG role strain from direct care, lack of resources, worry, role conflict, economic burden, mismatched expectations, increased tension, feelings of being manipulated and global strain.	*Mutuality*: Cronbach's alpha = .91; stability (*r* 6 weeks x 9 months) = .79. *Amount of direct care*: alpha = .86; *r* = .73. *Preparedness*: alpha = .72 and .71; *r* = .75. *Strain from direct care*: *r* = .60; *from lack of resources*, alpha = .77 and .78; *r* = .64; *from worry*, alpha = .84 and .82, *r* = .80; *from role conflict*, *r* = .70; *from economic burden*, alpha = .74 and .77, *r* = .68; *from mismatched expectations*, alpha = .53 and .45, *r* = .67; *from increased tension*, alpha = .86 and .91, *r* = .78; *from feelings of being manipulated*, alpha = .89 and .94 *r* = .62.	Psychometric assessment of scales; descriptive statistics of sample; hierarchical MRC for hypothesis testing - control variables at step 1, mutuality at step 2, preparedness at step 3. Significance level of .05. Small amount of missing data; when scores were missing on DV a listwise deletion procedure was employed for the MRC; group mean substituted for missing values on predictor variables.	Three aspects of strain -- direct care, increased tension and global strain appeared lower when mutuality and preparedness were higher. Mutuality was relatively stable across measurement times and explained significant additional variance in strain from feelings of being manipulated (15-23%), global strain (7-14%), mismatched expectations (13-24%), increased tension (12-14%), role conflict (6-12%) and direct care (6-10%). Preparedness explained significant additional variance in strain from feelings of being manipulated (5-6%), global strain (4-8%), mismatched expectations (6-10%), increased tension (5-12%), direct care (5-11%), lack of resources (5-15%) and worry (5-16%).	Large number of MRC analyses and small sample increases probability of Type I errors. These limitations considered acceptable by the authors due to relatively small shrinkage of R^2. Multiple regression analyses were used because a combined or derived score would not be as meaningful, and the intercorrelations among the nine outcome measures were not > .60. (Note, intercorrelation > .60 would indicate measurement of a common factor.)

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Ayanian, J. Z., & Epstein, A. M. (1991). Differences in the use of procedures between women and men hospitalized for coronary heart disease. *New England Journal of Medicine, 325*, 221-225.	*Purpose:* To assess the generalizability of reported differences in the use of coronary angiography, PTCA and CABS in men and women. *Design:* Retrospective review of cardiac catheterization and medical records. *Hypothesis:* Men were more likely than women to undergo major coronary procedures when they were hospitalized with known or suspected coronary heart disease.	Abstract data on 49,623 discharges in MA and 33, 159 discharges in MD. Abstracts represent all patients from 30 to 89 years of age who were discharged with diagnoses of MI, unstable angina, chronic ischemic heart disease, and nonrespiratory chest disease from nonfederal hospitals in MA and MD.	The data included principal diagnosis, secondary diagnoses, major procedures, age, sex, race, insurance status, and patient's ZIP code.	Used discharge abstracts that are prepared and used for hospital rate setting. Each agency reviews the data for accuracy.	Multiple logistic regression to estimate the odds of the use of a procedure, controlling for principal diagnosis, age, CHF, DM, race, and insurance status.	The odds of cardiac catheterization were 28% higher in MA and 15% higher in MD for men than for women. The odds of CABS were 45% higher in MA and 27% higher in MD for men than for women. To eliminate the possibility that differences were due to differences in hospital admission, a secondary analysis was done with patients diagnosed with an MI (n = 18, 759) in MA and MD. The odds ratios remained similar in magnitude and were statistically significant for coronary angiography and CABS. The cohorts of females were 42.6% and 45.9% female in MA and MD. Women were older than men, more likely to belong to an ethnic minority, more likely to be insured and more likely to be discharged with a principal diagnosis of unstable angina (men discharged with diagnosis of MI).	Data obtained at one hospitalization, subjects may have been readmitted for procedures (seems unlikely). Although the sample was certainly large enough, it still used data gathered for clinical purposes. Epidemiological studies can not consider individual variations.

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Beach, E. K., Maloney, B. H., Plocica, A. R., Sherry, S. E., Weaver, M., Luthringer, L., & Utz, S. (1992). The spouse: A factor in recovery after acute myocardial infarction. *Heart & Lung, 21*, 30-38.	*Purpose:* To explore the relationship between the spouse's social support, family stress, marital satisfaction, and sexual comfort and the patient's recovery after an MI. *Design:* Longitudinal, descriptive correlational. *Theoretical Framework:* Stress and coping.	Spouses of a subsample of patients after their first MI. Parent sample a convenience sample of 41 subjects from an urban medical center and two private hospitals in the Midwest. *n* for this report = 17 spouses (14 women, 3 men). Mean age of patients = 52 years (*SD* = 8.57). Spouse age not reported.	Social Support Inventory (SSI): Higher score more support. Family Inventory of Life Events (FILE): higher score, less stress. Spanier Dyadic Adjustment Scale (DAS): higher score more satisfaction. Comfort with sexual activity: 4 dimensions, hugging, foreplay, gentle and vigorous intercourse. Myocardial Infarction Recovery Index (MIRI): weighted combination of 7 recovery indicators.	SSI: correlated .80 with coded interview in validity study. Test-retest reliability = .81. FILE: Cronbach's alpha = .81, test-retest reliability = .80. DAS: Cronbach's alpha = .96. MIRI: Unpublished data, MIRI score correlated with interviewer's rating of recovery from .42 to .55.	Pearson correlation coefficients. Significance level of .10 due to low power and small sample size.	Spouse social support showed no relationship to patient recovery. Spouse family stress score was associated with the patient's recovery at 3 (*r* = .42, *p*= .09) and 6 mos (*r* = .50, *p* = .04). Spouse marital satisfaction was associated with patient recovery at 3 months *r* = .42, *p* = .10. No significant relationship at 6 mos. Spouse's sexual comfort was associated with patient recovery at 3 months and at 6 months. Correlation coefficients ranged from .44 to .76 across measurement times and sexual comfort subscales (hugging, foreplay, gentle intercourse, vigorous intercourse).	Results should be interpreted as suggestive because of study limitations, i.e., very small sample, convenience sampling, use of new measures, and correlation prohibits assigning direction. The author interprets findings as demonstrating that spouse's sexual comfort influences patient recovery. (Note, MIRI not well described; does not describe the derivation of weights.)

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Ben-Sira, A., & Eliezer, R. (1990). The structure of readjustment after heart attack. *Social Science & Medicine, 30*, 523-536.	*Purpose*: To elucidate the factors that may enhance or impede psychosocial readjustment after heart attack. *Design*: Descriptive, correlational. *Theoretical framework*: Not specified. The basic hypothesis underlying the study is that the readjustment after heart attack is the result of the interplay among impeding and facilitating factors.	Sixty-three married, Jewish males living in Jerusalem area, 3 to 24 months after a heart attack who requested monetary assistance. Mean age of sample = 53 years (*SD* = 6.2). Total possible number = 72.	Composite of items derived from other measures: affective, instrumental and cognitive adjustment; emotional, behavioral, and socio-cultural demands; individual instrumental, cognitive and affective resources; and perceived spouse affective, instrumental and cognitive support; perceived interspouse relationship i.e., flexibility in role allocation, decision-making and communication.	Items selected based on conceptual definitions. Factor analysis was used to ascertain the relationship of the items to the underlying factor. Items and factor loadings are included in an appendix to the article.	Smallest space analysis (SSA) in which the computer locates each variable as a point on a map according to the strength of the correlations among all variables. The stronger the positive correlation between two points, the smaller the distance between them. The structure of readjustment is based on the clustering of the variables. There is no assumption of a common underlying factor.	Inspection of the "map" of readjustment indicates the role of the spouse in readjustment after heart attack almost equals the role of individually controlled cognitive and affective resources. The 'structure' suggests the crucial function of spouse support and open communication channels, together with the individual's affective and cognitive resources in the readjustment following heart attack. These variables seem far more important than the self-controlled instrumental resources. Specifically, spouse encouragement and instrumental support are associated with fear reduction (r = -.52 and -.59) and with cognitive readjustment (r = .67 and .77).	Sample limited to males, < 60 years of age, living in Jerusalem, after a myocardial infarction. Appears to be a large number of relationships reported given sample size. I was unable to find a description of small sample analysis in standard texts. The author implies causal effect with what appear to be correlational data.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Bickell, N. A., Pieper, K. S., Lee, K. L., Mark, D. B., Glower, D. D., Pryor, D. B. & Califf, R. M. (1992). Referral patterns for coronary artery disease treatment: Gender bias or good clinical judgment? *Annals of Internal Medicine*, *116*, 791-797.	*Purpose*: 1. To determine whether a gender bias exists in referral for CABS among patients with catheterization documented coronary heart disease. 2. To evaluate the effect of referral bias on patient outcome. *Design*: Historical cohort study (1969 to 1984).	Total of 5,795 patients with catheterization documented coronary heart disease at a referral medical center in the Southeast US. Sample included 81% menand 19% women.	Data on prognostic factors -- type of angina, congestive heart failure, previous MI, anatomic disease, mitral insufficiency, age, LVEF, duration of symptoms and pain episodes/ week.	Not addressed. Clinical data.	Three risk groups (low, moderate, or high) for cardiac death based on prognostic factors. Calculated risk odds ratios from a logistic model of referral to surgery that included the spline transformation of baseline risk, gender and the interaction of baseline risk with gender. Time trends were evaluated for 3 periods: 1969 to 1974, 1975 to 1979, and 1980 to 1984.	Women were older, had more functional limitations, and tended to have a more aggressive symptom course. The symptoms of women were more likely to be "atypical". Men were more likely to have multivessel disease and impaired LV function. The average predicted risk for cardiac death was slightly less in women compared with men. When no adjustment was made for baseline risk for cardiac death, no statistical difference was found between men (46%) and women (44%) referred for surgery. After adjustment for baseline risk for cardiac death, women at low risk were less likely than men to be referred for CABS, but more women were as likely as men to be referred for CABS among more symptomatic and more severely diseased patients.	Data collected clinically and analyzed retrospectively. Secular changes in lay acceptance of surgery over duration of study. Physician awareness of surgical risk for women varied among the time periods. Unequal group size. Multiple comparisons

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Brown, J. & Rawlinson, M. (1976). The morale of patients following open-heart surgery. *Journal of Health and Social Behavior, 17*, 135-145.	*Purpose:* to assess the relative importance of selected factors in determining long-term morale of post-operative cardiac patients. *Design:* Cross-sectional, descriptive, correlational. *Theoretical framework:* Literature review led to 4 categories of variables thought to contribute to morale: 1. objective assessment of health status; 2. perceived health status; 3. social and demographic variables; and 4. coping style and depression.	Convenience sample of 150 subjects ≥ 1 year after valve replacement. Males = 87; females = 63. Mean age 48.2 yrs, (range 25 - 64). 11% attrition from contact to data collection.	*Morale:* Koltuv's Index of Self Satisfaction. *Medical variables:* duration of cardiac illness, bypass time, complexity of operation; months since surgery, NYHA classification, coexisting medical conditions. *Perceived health:* Cornell Medical Health Index; Tendency to retain or relinquish sick role (CSR). *Social variables:* Sex; age; marital and work status; SES. *Psychological variables:* MMPI depression and coping style.	Koltuv's Index had not been extensively tested before this study. Authors described their reason for using it rather than other more established measures of morale. Tendency to retain or relinquish the sick role was measured by a ten scale semantic differential instrument tapping four dimensions of meaning, the independence, evaluative, potency and activity factors. Psychometric statistics for this instrument arenot reported.	Correlation and regression. 1. Bivariate correlation matrix of the predictor variables with morale. Eliminated any variables not correlating with morale, $p \leq .05$. Stepwise MR was used to assess the contribution of each of the remaining predictors. Males and females were analyzed separately. Variables eliminated in the initial screening: time on bypass, complexity of operation, presence of other major health problem; sex; education; SES.	Results of MRC: 5 predictors explained 51% of the variance in morale for males, i.e., depression (partial $r = .37$, $p < .05$), duration of illness (partial $r = .26$, $p < .05$), coping style (partial $r = .37$, $p < .05$), marital status (partial $r = -.36$, $p < .05$), current sick role (partial $r = -.24$, $p < .05$). For females, 4 predictors explained 41% of the variance in morale i.e., physical symptoms (partial $r = .21$), marital status (partial $r = -.30$, $p < .05$), current sick role (partial $r = -.18$), and coping style (partial $r = .21$). Both males and females exhibited significantly greater than normal tendency to depression. Clinical assessment of the patient's health did not predict morale as well as did perceived health.	Cross-sectional design. Not all variables met the assumptions of MRC. MRC analysis was data driven. Small sample size given number of predictors, especially for subgroup analysis. Scaling of complexity of operation is questionable: 1. Least complex including aortic ball replacement, tricuspid or mitral valve surgery; 2. More complex including aortic valve replacement; 3. Complex, multiple valve surgery. Interviews took place 10 to 103 months postoperatively, mean 41.3 months.

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Case, R. B., Moss, A. J., Case, N., McDermott, M., & Eberly, S. (1992). Living alone after myocardial infarction: Impact on prognosis. *JAMA, 267,* 515-519.	*Purpose:* To determine if the presence of a disrupted marriage or living alone would be an independent prognostic risk factor for a subsequent major cardiac event. *Design:* Pro-spective evaluation in the placebo wing of a randomized, double blind drug trial.	Multicenter trial in a mixture of community and academic hospitals in the US and Canada. 967 patients followed for 1.1 years and 530 patients followed for 2.2 years after an initial MI.	Medical predictors: NYHA func-tional class, LVEF, freqency of ventricular ectopics, pulmonary congestion on CXR, prior MI, use of β-blockers. Social predic-tors: level of education, age, race, and living alone or a disrupted marriage. Outcome measures: recurrent nonfatal infarction or cardiac death.	Not addressed. Clinical indica-tors.	Cox proportional hazards regres-sion model was used to select best predictors of outcome from medical and psychosocial variables. After the primary risk model had been constructed living alone and having a disrupted marriage at the time of enroll-ment were entered.	Patients living alone were older ($M = 61$, $SD = 10$ *vs* $M = 58$, $SD = 10$) and had a higher incidence of prior infarction (45 *vs* 33) than those living with others. A significant ↑ in both outcomes occurred with each of the physiological predictors. No differences for either end point between whites and non-whites. The cumulative rate of recurrent cardiac events for those living alone was higher throughout the follow-up period ($p = .001$). Addition of "living alone" to the model made a significant contribution to the prediction of recurrent cardiac events (indepen-dent hazard ratio = 1.54, $p < .03$). Disrupted marriage was not a significant independent predictor. Risk for women living alone was greater than for men (hazard ratio 2.34 *vs* 1.24).	Living arrange-ments were determined at the time of enrollment and could have changed before the end-point was reached.

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CASS principal investigators and their associates (1983). Coronary Artery Surgery Study (CASS): A randomized trial of coronary artery bypass surgery. Survival data. *Circulation, 68,* 939-950.	*Purpose:* To compare results of medical and surgical therapy on total mortality in well-defined subsets of patients with coronary artery disease. *Design:* Randomized clinical trial. Patients were examined at 6-month intervals for the duration of follow-up.	16,626 registry patients were screened, 780 were randomized, 390 each to medical and surgical therapy. Groups were similar, age *M* = 51.2 years; 90.3% male; 98.3% white, 39.7% smoked cigarettes. Excluded: previous CABS, unstable or progressive angina, CHF, coexisting illness that would increase the likelihood of death within 5 years, LMCA disease, EF ≤ 35%, age > 65 and those likely to require combined procedures.	Initial cardiac catheterization, follow-up at 6 month intervals including: death, hospitalization, new or recurrent cardiovascular symptoms, and new or continuing drug therapy. ECG at 6 month intervals for 2 years, and then yearly. Maximal ETT at 6, 18, and 60 months. Repeat cardiac catheterization in all willing patients at 60 months.	Clinical data, reliability and validity not discussed. Extensive procedures for data verification were followed at the centers.	Group differences at baseline were assessed by chi-square or *t* tests. Log-rank statistic was used to assess significance of the observed differences in survival curves. Data on events were included according to the original randomization group, regardless of subsequent therapy.	Of 390 subjects randomly assigned to surgery, 2 died before surgery and 41 (11%) "crossed" to medical management. Of 390 patients assigned to receive medical therapy, 23.5% had "crossed" to surgery by the 5 year follow-up. Operative mortality (death within 30 days) was 1.4%; perioperative MI, 6.4%. Medical therapy included efforts to modify risk factors, nitrates and β-blockers. There were no significant differences among survival rates for the two treatment groups. At 5 years the average mortality assigned to surgical patients was 1.1% and the annual mortality for medical patients was 1.6%.	CASS examined the benefits of surgical versus medical therapy in a population of patients who had relatively mild CAD. This is a subset of patients for whom the choice of therapy is usually made by patient or MD preference. While the study is valuable in demonstrating "no difference" in this group, it has often been extended to impugn CABS more generally. There was a relatively high crossover (23.5%) to surgery that was analysed according to intention to treat.

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CASS principal investigators and their associates (1983). Coronary Artery Surgery Study (CASS): A randomized trial of coronary artery bypass surgery. Quality of life in patients randomly assigned to treatment groups. *Circulation, 68*, 951-960.	*Purpose:* To compare results of medical and surgical therapy on total mortality in well-defined subsets of patients with coronary artery disease. To examine the observed effect of medical and surgical therapy on descriptors of quality of life. *Design:* Randomized clinical trial. Patients were examined at six month intervals for the duration of follow-up.	16,626 registry patients were screened, 780 were randomized, 390 each to medicine and surgery. Groups were similar, age $M = 51.2$ years; 90.3% male; 98.3% white; 39.7% smoked cigarettes. Excluded: previous CABS, unstable or progressive angina, CHF, coexisting illness that would increase the likelihood of death within 5 years, LMCA disease, EF ≤ 35%, age > 65 and those likely to require combined procedures.	Descriptors of quality of life included: chest pain status (CCVC), CHF, activity limitation, employment status, recreational status, drug therapy, hospitalizations, and ETT performance.	These clinical data were assumed to reflect QOL. There is no discussion of their validity as indicators of the construct.	Group differences were assessed by chi-square and by *t* tests as indicated. Data obtained at 1, 3, and 5 years are presented, but are representative of the data trends observed at 6 month intervals.	A greater proportion of surgical patients were free of pain at each interval. There were no significant differences in prevalence of heart failure. More patients in the surgical group reported no limitation of activity. Adjusted ETT time increased in both groups, but increased much more in the surgical group. There were no differences in employment or recreational status between groups. Drug use decreased markedly and was significantly less in the surgical group. Excluding hospitalization for CABS, the total number of days hospitalized were not significantly different. No significant differences in risk factor management at baseline or follow-up. The percentage of patients smoking fell slightly in the first year in both groups, without subsequent change.	CASS examined the benefits of surgical versus medical therapy in a population of patients who had relatively mild CAD. This is a subset of patients for whom the choice of therapy is usually made by patient or MD preference. The study demonstrated "no differences" in mortality but significant improvement in QOL variables. A serious limitation of the study is the inadequate definition of QOL based exclusively on medical factors and derived data.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Charlson, M. E., Pompei, P. Ales, K. L., & MacKenzie, C. R. (1986). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Disease, 40,* 373-383.	*Purpose:* To develop a prospectively applicable method for classifying comorbid conditions that might alter the risk of mortality for use in longitudinal studies. *Design:* Phase I descriptive correlational; Phase II exploratory correlational.	Phase I: 559 patients admitted to the medical service of an academic teaching hospital in New England. Phase II: 685 women with primary breast cancer treated at the same medical center.	Phase I: MD rating of illness severity; demographic and clinical characteristics; number and severity of comorbid diseases. Outcome: death at 1 year. Phase II: Disease characteristics --anatomic stage, nodal status, histologic type, menstrual status, symptomatic status, and rate of disease progression. Number and severity of comorbid diseases. Outcome: Death due to cancer or to comorbid condition.	Clinical data. Retrospective chart analysis. Reliability and validity of clinical data not discussed.	Statistical difference between mortality rates was examined by chi-square. The relationship of potential prognostically important variables to survival was assessed using Cox's regression method for proportional hazards analysis. A composite comorbidity-age score was calculated for each patient and the actual 10-year survival was evaluated.	Total number of comorbid diseases predicted 1-year mortality ($p < .05$). A weighted index using the adjusted relative risks (RR) as weights was developed. Weights were assigned as follows: RR of ≤ 1.2 were dropped; RR $\geq 1.2 < 1.5$ were given weight of 1; RR of $\geq 1.5 < 2.5$ given weight of 2; RR of $\geq 2.5 < 3.5$ given weight of 3; RR ≥ 6 were given weight of 6. The weighted index reflects both number and seriousness of comorbid conditions. The weighted index was a significant predictor ($p < .001$) of 1 year survival. In Phase II, only age was a significant predictors of death from comorbid condition. Age and comorbidity index were the only two significant predictors of risk of comorbid death ($p < .001$).	The number of patients with any given condition was relatively small.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Desharnais, R., Godin, G., Jobin, J. Valois, P. & Ross, A. (1990). Optimism and health-relevant cognitions after a myocardial infarction. *Psychological Reports, 67,* 1131-1135.	*Purpose:* To investigate the relationship between dispositional optimism and health relevant cognitions following a myocardial infarction. *Design:* Exploratory, correlational.	Convenience sample of 158 patients after MI (22 women, 136 men). Mean age = 52.7 (*SD* = 8.1 yr.).	Life Orientation Test (LOT). Perceived susceptibility to having another heart attack within a year. Perceived seriousness of having another heart attack within a year, fear of having another heart attack during the next year, and perceived ability to lessen the risk of having another heart attack during the next year (self-efficacy).	LOT had an internal consistency reliability of .76 and a test-retest reliability of .79. Psychometric characteristics of the other measures were not discussed.	Descriptive statistics, Student's *t*-test. Median split was used to create two groups, optimists and pessimists.	Mean optimism score = 20.9 (*SD* = 5.81). Median = 22. Mean scores of optimists were significantly different from pessimists for perceived susceptibility ($t_{(156)} = 2.43$, $p < .05$), severity ($t_{(156)} = 2.52$, $p < .05$), and fear of having another MI ($t_{(156)} = 3.79$, $p < .001$). The difference between optimist and pessimist self-efficacy scores were not significantly different.	Reliability and validity of measures of health relevant cognitions was not addressed. Self-efficacy was operationalized by a single item that asked to what extent (7-point scale) they thought they could reduce the risk of having another MI within the year.

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Dracup, K., Heaney, D. M., Taylor, S. E., Guzy, P. M., Breu, C. S. (1989). Marital satisfaction predicts adjustment to cardiac illness. *Circulation, 80*, II-390.	*Purpose:* To determine predictors of psychosocial adjustment in cardiac patients at risk for sudden cardiac death.	51 cardiac patients less than 1 year after MI or CABS; 86% male, mean age = 65 years.	Marital satisfaction subscale of the Spanier Dyadic Adjustment Scale. Multiple Affect Adjective Checklist. Psychosocial Adjustment to Illness Scale.	Not described in this brief abstract. Established measures.	Not described results indicate multiple regression.	The only predictor of psychosocial adjustment at 3 months was marital satisfaction. Marital satisfaction predicted 35% of the variance in psychosocial adjustment ($F = 26.62$, $p < .001$).	Abstract of poster. Method of analysis not described; unknown sequence of entry of variables.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Edwards, F. H., Taylor, A. J., Thompson, L., Rogan, K. M., Pezzella, T., Burge, J. R., & Hetzler, N. (1991). Current status of coronary artery operation in septuagenar-ians. *Annals of Thoracic Surgery, 52*, 265-269.	*Purpose:* To determine if elderly patients could safely undergo revascularization in the current era of high risk CABS. *Design:* Retro-spective case series analysis.	121 consecutive patients age ≥ 70 years who had coronary revascularization at Walter Reed Medical Center from 1984 to 1989. Mean age was 75.2 years with a range of 70 to 84 years.	Clinical data.	Not addressed.	Chi-square analysis; multivariate analysis using stepwise, logistic regression. A logistic risk equation was generated using four predictors (inotropic support, hyper-tension, reoperation, and intravenous nitroglycerine).	Average number of vessels bypassed was 3.4 (range 1 to 5) and the average hospital stay lasted 11 days. Operative mortality was associated with surgical priority: emergent cases, 22.2%; urgent cases, 8.6%; and elective cases, 2.9%. In comparison with younger patients, older patients had more left main disease ($p < .001$), more 3-vessel disease ($p < .001$), more PVD ($p < .001$), and were more likely to have an LVEF < .5. The logistic risk equation was able to accurately predict operative mortality at the extremes of the risk spectrum. Atrial dysrhythmias were present in 27% of the sample.	Used same patients to generate the model and test it. Use of regres-sion to select predictors from a large number of predictors.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Ewart, C. K., Taylor, C. B., Reese, L. B. & DeBusk, R. F. (1982). Effect of early postmyocardial infarction exercise testing on self-perception and subsequent physical activity. *American Journal of Cardiology, 51*, 1076-1080.	*Purpose:* To determine correspondence between pretreadmill (TM) self-efficacy and TM performance; To measure changes in self-efficacy resulting from TM testing and subsequent counseling; To determine whether subsequent physical activity in the normal environment was more closely related to exercise performance or to self-efficacy. *Design:* Exploratory, single group intervention. *Theoretical Framework:* Self-efficacy.	40 male patients, 3 weeks after MI, mean age = 52 ± 9 years. 90% were married and most were in the middle or upper-middle socioeconomic status.	Beck and Hamilton depression; Spielberger anxiety; Locke-Wallace marital adjustment. Self-efficacy scales for walking, running, climbing stairs, engaging in sexual intercourse, lifting objects weighing 10-75 pounds, and overall ability to tolerate activity. Response options ranged from 10 (uncertain) to 100 (certain). ETT used endpoints of symptoms or ↓ SBP of 10 mm Hg. Posttesting activity by self-report and Vitalog.	Reliability and validity of measures of psychological concepts not addressed. Validity of self-reported activity was determined by direct physiologic measurement of physical activity and heart rates using the Vitalog in a subsample.	Descriptive statistics, correlations.	Mean scores for depression, anxiety, and marital adjustment did not differ from healthy adults. Patients attained an average treadmill work load of 6.1 ± 1.4 mets and an average peak heart rate of 132 ± 15 BPM. Correlation coefficient between peak TM heart rate and post-TM self-efficacy (r = .50) was higher than between peak TM heart rate and preTM self-efficacy (r = .36). Changes in self-efficacy scores after exercise testing and counselling predicted subsequent changes in self-reported activity levels (r = .34 to .53, p <.01). Peak TM heart rate was not significantly correlated with self-reported mean heart rate or exercise levels at home.	Subjects were males ≤ 70 years of age. It is not known if self-efficacy relations would hold in a sicker, more socially disadvantaged sample. Performance of psychological measures not reported. State or trait anxiety not specified. The total sample of 40 was divided into subsamples for Vitalog monitoring. The investigators report there were not significant differences, but the data are not provided.

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Fiore, A. C., Naunheim, K. S., Barner, H. B., Pennington, D. G., McBride L. R., Kaiser, G. C., & Willman, V. L. (1989). Valve replacement in the octogenarian. *Annals of Thoracic Surgery, 48*, 104-108.	*Purpose:* To determine the efficacy of valve replacement in patients over age 80 years. *Design:* Retrospective, case series analysis.	11 men and 14 women, mean age 82 years (range 80 to 82 years) having cardiac valve replacement or combined valve and CABS.	Age, sex, race, admitting diagnosis, cardiac risk factors, procedure performed, and postoperative complications. Regional wall motion abnormality measured by LV score. Time until discharge, operative mortality, complications, NYHA functional classification, and intervening hospitalization for complication were also determined.	Clinical data. Reliability and validity not addressed.	Descriptive statistics, Student's *t*-test, and actuarial survival rate calculated by the Kaplan and Meier technique.	There were 5 hospital deaths (20%) and 4 late deaths. Postoperative complications included atrial fibrillation or atrial flutter in 28%, acute renal failure in 2 patients (10%), permanent stroke in 5 patients (25%), and transient neurological dysfunction in 3 patients (15%). Common minor complications included confusion, anorexia, nausea, and delay in ambulation. Mean postoperative hospital stay = 18 ± 16 days. Follow-up ranged from 7 to 85 months. All hospital survivors improved at least one functional class. Actuarial survival at 1 and 2 years = 79 and 69% respectively.	Retrospective case series analyses.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Flynn, M. K. & Frantz, R. (1987). Coronary artery bypass surgery: Quality of life during early convalescence. *Heart & Lung, 16*, 159-167.	*Purpose:* to determine the impact of CABS on patients' lives and which factors contributed most to their overall quality of life during early convalescence. *Design:* Exploratory design. *Theoretical framework:* Quality of life - relief of symptoms, physical activity, leisure, social participation, family relationships, sexual activity, material wealth or possessions, ability to return to work, and mood or morale.	Convenience sample of 29 adult males, 6 to 10 weeks after first CABS. Mean age of subjects = 58 years (range 43 to 74 years); 21% were ≥ 67 years of age; all subjects were white; 25 subjects were married, one was separated and three were widowed; 55% of subjects reported a history of one or more chronic illnesses in addition to heart disease. None of the patients was involved in a structured rehabilitation program.	*Cantril Ladders:* life satisfaction, health perception, domain importance, domain satisfaction and achievement of expectations for recovery. *Sociological-health status inventory:* demographic, occupational, and health status variables. *Exercise tolerance test (ETT).* *Social support scale:* Current Social Network Scale.	Validity and reliability for the self-anchoring scale was established by Cantril who tested the instrument on 20,000 people in 13 different countries. The scale has been replicated more than any other measure of well-being. Current Social Network Scale - average item to scale correlation was .50.	Descriptive statistics; frequencies; correlations; multiple regression.	No overall improvement in return to work. Life satisfaction, now = 6.41 (10-step ladder), expected satisfaction in 2 years = 7.75; perceived health, now = 6.58, 2 years ago = 6.03, and expected in 2 years = 7.65. Mean satisfaction with achievement of recovery expectations = 7.8. Present and future health (r = .52, p <.01); correlates of life satisfaction include present (r = .58, p < .001) and future health (r = .37, p < .05), and achievement of expectations (r = .40; p < .05). Mood, material wealth, and relief of symptoms were the 3 most powerful predictors of life satisfaction.	Small convenience sample; first time CABS; Post-event measures with retrospective evaluation of life satisfaction, and health perception 2 years earlier. Apparently did not evaluate the significance of differences in perceived health and life satisfaction 2 years before to after surgery. Thus did not answer their question related to the impact of CABS on quality of life. Only 14 patients performed a treadmill test.

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Gersh, B. J., Kronmal, R. A., Schaff, H. V., Frye, R. L., Ryan, R. J., Mock, M. B., Myers, W. O., Athearn, M. W., Gosselin, A. J., Kaiser, G. C., Bourassa, M. G., & Killip, T. (1985). Comparison of coronary artery bypass surgery and medical therapy in patients 65 years of age or older. *New England Journal of Medicine, 313*, 217-224.	*Purpose:* To compare the influence of surgical and medical treatments on survival and functional outcome in patient ≥ 65 years of age with coronary heart disease. *Design:* Large, prospective, nonrandomized, multicenter study. *Theoretical framework:* None apparent. Authors conclude that survival is better in surgically treated patients, but that quality of life should also be considered in defining the outcome of CABS.	Sample drawn from the CASS registry. 1,491 cases over age 65, subjects included surgicallyl (n= 861) and medically (n = 630) treated patients. The overall sample was 72% male. A lower-risk subset that excluded subjects with functional impairment due to CHF, severe angina, acute coronary insufficiency, and LMCA stenosiswas identified and included 109 of the surgical and 125 of the medical cases.	Clinical variables: gender; age; DM, HTN, associated medical diseases; cigarette smoking; history of MI, cardiac arrest, or functional impairment due to CHF, CHF scores, pulmonary rales; unstable angina, severity of angina; number of diseased vessels, number of segments with ≥ 50% stenosis, LV wall motion score, LVEDP; cardiac enlargement on chest x-ray.	Clinical data, reliability and validity not discussed.	Survival curves were calculated by the life-table method and compared by log-rank statistics. Univariate analyses of discrete variables were compared by a chi-square test, and continuous variables were compared by the two sample t-test. The Cox proportional hazards model was used to evaluate prognostic variables.	More women, more associated medical diseases, and poorer LV function in medical group. More severe angina and more 3 vessel disease in surgical group. Cumulative 6-year survival was better in the surgical group -- 80% compared with 63% ($p < .001$). At 5 years, 62% of the surgical patients and 29% of the medical patients were free of chest pain. Incidence of sudden death and other cardiac-related deaths were decreased among surgically treated patients. When survival rates were adjusted for prognostic variables (LV wall motion, CHF, number of diseased vessels, and comorbidity) 6 year survival was better in surgically treated patients ($p < .001$). Cumulative survival rate in the low risk subgroup was comparable for medically and surgically treated patients.	Not a randomized trial, it is unknown what caused physicians to recommend or patients to accept medical versus surgical therapy. Results from this report are often erroneously cited by other authors as part of CASS -- not a randomized trial.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gilliss, C. L. (1984). Reducing family stress during and after coronary artery bypass surgery. *Nursing Clinics of North America, 19*, 103-112.	*Purpose:* To examine the relationship of a patient's subjective stress to that of the spouse; To report the major sources of stress associated with CABS and recovery as described by patients and spouses; and, To explore the couple's social process of recovery as it relates to subjective stress. *Design:* Longitudinal, descriptive design. Qualitative study with a few quantitative measures. *Theoretical framework:* Family stress theory.	71 patient-spouse dyads completed the in-hospital phase; 41 dyads completed the 6-month follow-up phase.	Two semi-structured interviews: 1. Events leading up to surgery and family changes related to illness; 2. Experiences of patient and spouse during recovery. Impact of Event Scale completed independently by the patient and spouse, after the first interview. The first interview was conducted in the hospital 3-8 days after surgery. The second interview was conducted in the home 6 months after surgery.	No psychometric data is provided about the Impact of Event Scale. Does not specify who conducted the interviews or if they were all conducted by the same person.	Descriptive statistics, paired *t*-tests. Unspecified method of qualitative analysis.	Stress during hospitalization was higher for spouse than patient ($t = -3.43$, 70 *df*). Patient and spouse scores were correlated ($r = .28$; $p = .02$). Post discharge: Patients were happy to be home; fatigue and physical pain limited their activity in the first week and then they began to "test" their limits. Some experienced discouragement or depression and reported fear that they would never be "normal" again. Spouses were frightened initially, but began to relax and regroup. One specific stress described by spouses was having to monitor the patient, but not feeling prepared for the job. They felt responsible to protect the patient, and tried to accumulate proof for themselves that the patient was no longer fragile. Successful completion of activities, return to work and	No information about the family relationships or patterns of dealing with stress. No information about illness severity and stress. 42% of the dyads lost to 6 month follow-up. The results imply qualitative analysis, the method is not described. This was not truly a research report.

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						appraisal of the physician constituted proof. The stress of surgery put the family at risk for the reemergence of old conflicts and unhealthy patterns of family behavior. Conflict during recovery appeared to be related to the "let down" and fatigue in recovery, respective fears about a full recovery, and the numerous adjustments that needed to be made in their lives as a result of the illness. Patients and spouses were "on their own" for 4-6 weeks post discharge and did not know who to call with questions or problems. Most families reported that after 6 months they had reorganized their lives and the surgery no longer governed their daily activities. The author concluded that hospitalization for bypass is stressful for the spouse and that recovery can be a disorganizing experience for the family.	

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gilliss, C. L., Gortner, S. R., Hauck, W. W., Shinn, J. A., Sparacino, P. A., & Tompkins, C. (1993). A randomized clinical trial of nursing care for recovery from cardiac surgery. *Heart & Lung, 22*, 125-133.	*Purpose:* To determine the efficacy of a psychoeducational nursing intervention in patients who receive coronary artery bypass graft and valve repair surgery. *Design:* A cluster-randomized controlled trial. *Theoretical framework:* Self-efficacy.	156 patients age 25 to 75 years (M = 59.5) and their primary caregivers. Subjects were recruited from 2 hospitals in Northern CA. Six month retention rate of 95% (n = 149 pairs). Patients were 80% male. CABS or redo CABS accounted for 72% of male patients. Valve and redo valve procedures accounted for 71% of the female patients.	Profile of Mood States (POMS). Self-efficacy scales for walking, lifting, climbing, general activity, and work assessed on a scale of 0 to 10. Activity check list corresponding with the activities listed on the self-efficacy scales. Quality of life (QOL) a single item rating from 0 to 10. All measures were collected at 4, 12, and 24 weeks. In addition self-efficacy and activity data were collected at 8 weeks.	POMS: Cronbach's alphas for the 6 subscales ranged from .70 to .93 in this study. Internal consistency for each efficacy category scale was estimated at each data collection point and ranged from .67 to .99. Internal consistency estimates for the activity scale ranged from .66 to .99.	Descriptive statistics, repeated measures analyses, multiple correlation and regression.	No significant differences at baseline between groups. Intervention demonstrated main effects for ↑ self-efficacy in walking (p = .02), self-reported walking (p = .01) and lifting (p = .03). Significant main effects for time were seen across all self-efficacy expectations, self-reported activity, and mood states. Treatment by time interaction effects for lifting (p = .01) and QOL (p = .02). For QOL, the interaction favored the control group. Significant predictors of QOL at 24 weeks included baseline QOL and NYHA class at 4 weeks. Significant predictors of activity at 6 months included the set of age, gender, type of surgery and baseline NYHA class; NYHA class at 4 weeks, and self-efficacy expectations for general activity at 12 weeks.	None detected.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gilliss, C. L. & Rankin, S. H. (1988). Social and sexual activity after cardiac surgery: A report of the first 6 months. *Progress in Cardiovascular Nursing, 3*, 93-97.	*Purpose:* To describe changes and follow-up patterns in social and sexual activity reported by patients during the first 6 months after cardiac surgery. *Design:* Part of a larger study of recovery after open-heart surgery. Pro-spective, longitudinal, design. Data were collected on the night before surgery and at 3 and 6 months after surgery. *Theoretical framework:* QOL- authors state that the resumption of social and sexual activities are gross indices of QOL.	Convenience sample of patient-spouse pairs; 52 pairs provided complete data on social activities and 45pairs on sexual activities. Mean age of patients reporting social activity, 60.6 years; sexual activity, 62.2 years. Subsample from the "Improving Family Function-ing Study".	New measure, dimensions assessed: physical activity, social activity, sexual activity, risk reduction behaviors, physical symptomatology, medication usage, and complications related to surgery. On the night before surgery, and 3 and 6 months after surgery: "As compared with 6 months before surgery, is your social/ sexual activity greater, less, or the same frequency?" Response codes: -1 = less, 0 = no change, and +1 = greater	Not addressed.	Repeated measures analysis of variance to examine the main effect of time for social and sexual activity.	*Social activity:* There were no differences by gender or type of surgery. A significant increase was seen between the 3 and 6 month reports ($p = .04$). Reports of the level of social activity increased significantly over the six month period ($p = .03$) and reflected a change from negative to positive scores (-.27 to .08). *Sexual activity:* There were no differences by gender or type of surgery. A steady and significant increase is seen over the 6 month period from hospitalization to 6 months postsurgery ($p = .01$); no statistically significant gains are demonstrated between the interval reports and the scores approach, but do not reach zero (-.51 to -.22).	New measures used for study, no evaluation of their psychomet-ric properties. Data were collected from the patient, but are reported as dyadic data.

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Given, B., Stommel, M., Collins, C., King, S., & Given, C. W. (1990). Responses of elderly spouse caregivers. *Research in Nursing & Health, 13*, 77-85.	*Purpose*: To examine how patient characteristics, caregiver characteristics, and the caregiving environment predict four domains of spouse caregivers' responses to the caregiving role. The four domains are: negative reactions, role responsibility, family abandonment and impact on daily schedule. *Design*: Descriptive correlational.	129 spouse caregivers (CG): 75% female, mean age = 69 years.	Care receiver (CR) characteristics: functional dependencies, + and - behaviors, emotional and physical health, age. CG characteristics: emotional and physical health, age, sex, employment and marital status. Caregiving environment: amount of direct care, help from others, affective support. CG reactions: negative reactions, role responsibility, family abandonment, and impact on daily schedule.	Inter-rater reliability for ADL was .88 for IADL, .88. Co-efficient alpha for the positive behavioral scale was .80, and for the negative behavioral scale, .79. Co-efficient alpha for each of the subscales of CG reactions was ≥ .81. Items were identified from a larger pool of items (111) by exploratory factor analysis and confirmed in the current study. Subscale structure was replicated on an independent sample of caregivers of Alzheimer's patients (*N* = 213).	Summary scores for each variable were calculated. Multiple regression was used to predict each of the categories of CG responses. The independent contribution of each category of variables to the prediction of CGs' reactions was identified and the relative importance of the different categories was prioritized.	Spouse CGs were more involved with IADLs than with ADLs and had few persons helping them with caregiving. Negative reactions to caregiving were predicted by CG emotional health, negative CR behaviors, and CR physical health. CR characteristics, caregiving environment, and CG characteristics explained 52% of the variance in spouse CGs' perceptions of role responsibilities, 62% of the variance in feelings of abandonment, and 51% of the variation in the impact of caregiving on schedules. Negative responses to caregiving were related to negative CR behaviors, CR physical health, and CG emotional ill health. Responses of CGs in all 4 domains were primarily due to cognitive function of the CR, dependencies in IADLs and CG characteristics of age and physical health.	Mean and SD are reported for measures of CG physical and emotional health. These were measured by single item questions and the response categories are not described. I assume response was the same as that used by CGs to rate CRs' health, i.e., a 4-point scale ranging from excellent to poor.

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Goldberg, K. C., Hartz, A. J., Jacobsen, S. J., Krakauer, H. & Rimm, A. A. (1992). Racial and community factors influencing coronary artery bypass graft surgery rates for all 1986 medicare patients. *JAMA, 267,* 1473-1477.	*Purpose:* To examine the differences in the rates of coronary artery bypass surgery (CABS) between white and black Medicare patients. *Design:* Cross-sectional study of national data.	Data are from all Medicare recipients in the United States in 1986.	Sex and age adjusted CABS rates for whites and blacks over age 65 years. (See Data Analysis.)	Not addressed.	Race- , sex- and age-specific CABS rates were computed for each state and Standard Metropolitan Statistical Area by dividing the number of CABS for Medicare beneficiaries of the given age, sex, and race by the Census bureau population estimate. Adjusted CABS rates were computed by standardizing to the entire US population. Adjusted rates of myocardial infarction were derived in the same way.	The national age-, sex-, and race-adjusted CABS rate for persons over the age of 65 years was 25.6 per 10,000. The rates varied widely among the states. For whites the national age- and sex-adjusted CABS rate was 27.1 per 10,00 (40.4 for white men and 16.2 for white women), but for blacks it was only 7.6 per 10,000 (9.3 for black men and 6.4 for black women). In WA state the age- and sex- adjusted CABS rate for whites was 37.1 and for blacks it was 20.3. The number of thoracic surgeons per 100,000 and location in the Southeast were correlated with CABS rate for whites, but not for blacks. Different rates were not explained by differences in the rate of MI.	The diagnosis of MI is frequently miscoded. Census data are not equivalent to Medicare eligibility and the differences are greater for blacks than for whites. Limited available information on demographic factors that may influence CABS rate, e.g., socioeconomic factors.

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Goldman, L., Hashimoto, B., Cook, F. & Loscalzo, A. (1981). Comparative reproducibility and validity of systems for assessing cardiovascular functional class: Advantages of a new Specific Activity Scale. *Circulation, 64*,1227-1234.	*Purpose:* To compare the reproducibility and validity of the new Specific Activity Scale (SAS) with other common measures of C-V function. *Design:* Exploratory correlational.	75 patients referred for exercise treadmill (TM) testing at Peter Bent Brigham Hospital. 56 were referred for evaluation of chest pain, 12 for other symptoms, and 7 were asymptomatic. Based on exercise duration, 38 patients were class I, 23 patients were class II, 13 patients were class III, and one patient was class IV.	Canadian C-V Society (CCVS) Functional Classification. NYHA Functional Classification. ETT standard Bruce protocol. Specific Activity Scale.	Both the CCVS and NYHA functional classifications are commonly used clinically. The SAS is a newly developed measure. Reproducibility was the inter-rater agreement of functional class. Validity was the agreement of the functional classification estimate with patient classification based on TM performance. See Results.	Chi-square with 2 df was used to examine the proportion of times that the functional class estimates were reproducible and valid for each of the 3 classifications. If the overall chi-square was significant, Mantel-Haenszel matched analysis was used. Spearman correlation coefficients were used to compare functional class with exercise duration.	The SAS and the CCVS both had a reproducibility of 73%, which was significantly higher than the 56% reproducibility of the NYHA system. NYHA estimates agreed with exercise TM performance only 51% of the time; CCVS = 59%, and the SAS = 68%. The SAS was significantly more likely to predict TM performance ($\chi^2 = 4.57$, $p = .033$). Both the CCVS and NYHA classification tended to underestimate performance. The SAS estimates were more valid in functional class I, II, and III than were either of the other classifications.	Of the patients tested only one was Class IV. The assumption that functional capacity is solely determined by oxygen consumption underlies this study. In fact, other factors (emotional, effort) seem to affect the assignment to functional class based on symptoms.

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Gortner, S. R., Gilliss, C. L., Shinn, J. A., Sparacino, P. A., Rankin, S., Leavitt, M., Price, M. & Hudes, M. (1988). Improving recovery following cardiac surgery: A randomized clinical trial. *Journal of Advanced Nursing, 13*, 649-661.	*Purpose:* To test the effectiveness of nursing interventions to improve posthospital recovery at home. *Design:* Randomized clinical trial. *Theoretical framework:* Self-efficacy and family stress theory. *Intervention:* a counselling session, and nurse initiated telephone calls during the recovery period. Calls were conducted for data collection, coaching, and monitoring.	Convenience sample of 67 patient- spouse dyads having CABS. Sample consisted of 54 male patients; mean patient age = 61.5 years. 15% attrition at 3 months (6 control subjects, and 4 experimental subjects), no further attrition at 6 months.	Family APGAR; Family Inventory of Resources for Management (FIRM); Marital Satisfaction (MAS); Expected benefits from surgery; Self-efficacy appraisal; Self-reports of risk factor management and Profile of Mood States (POMS).	*Family APGAR:* Cronbach's alpha in this sample, .83 to .87. *FIRM:* Cronbach's alpha this sample, > .89. *MAS:* Cronbach's alpha this sample .73 to .81. *Self-efficacy scales* provided internal reliability coefficients from .58 to .98 at 12 weeks and .71 to .96 at 24 weeks. *POMS:* Cronbach's alphas, .79 to .94. The author's do not report psychometric data, sensitivity of measures, or evidence for validity of the measures from other studies.	Descriptive statistics, independent *t* tests to compare treatment groups, correlations.	No significant differences between groups at 6 months. Treatment groups were combined to examine influence of age and gender on recovery. Subjects > 70 years had more severe heart disease by NYHA criteria than subjects < 70 yrs.; subjects over 70 increased their perceived efficacy of general exertion between 3-6 months, whereas those in the < 50 yrs. group decreased theirs; realized benefits were greater (90%) for over-70 than under-50 (59%) group; under-50 reported more hostility and depression. Men had higher ratios of realized to expected benefits (77-85%) than did women (47-54%). Subjects in NYHA class I and II had higher self-efficacy expectations for climbing and for interactions at work than those in class III and IV.	Small subsamples. Missing data at all time points; handling of missing data is not described. Sensitivity of outcome measures is not addressed. Insensitive measures might explain the absence of significant findings. Not all of the outcomes are logically related to the intervention. When comparing realized to expected benefits ratios across age groups one can not determine if the difference rests in lower expectations or greater achievement.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gortner, S. R., Harr, J., Paul, S. M., & Hlatky, M. A. (1992). Quality of life, life satisfaction and perceived recovery of cardiac surgery elders. *Circulation, 86*, I-818.	*Purpose:* Not stated. *Design:* Descriptive, longitudinal.	129 cardiac elders undergoing heart surgery at 6 Northern California hospitals. Age range 70-91 years, $M = 76$ years. 94 males, 94% Caucasian, 59% CABS; 18% valve; 16% combined procedures.	Preoperative interviews assessed expectations for recovery, quality of life, and life satisfaction on a scale of 0 to 10; reassessments were made by telephone at 1 and 2 months postsurgery.	Not addressed.	Descriptive statistics, repeated measures ANOVA.	Mean preoperative quality of life score = 6.5, life satisfaction = 7.0 and expected recovery = 9.1. Repeated measures ANOVA revealed significant increases in perceived QOL from baseline to 2 months (F = 4.36, p = .015), but a significant decrease in perceived health recovery at 1 month (F = 29.48, p , .001) despite reasonable activity.	This information is taken from an abstract of a poster presentation at AHA. Data are prelimary findings in Gortner's ongoing study.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gortner, S. R., & Jenkins, L. S. (1990). Self-efficacy and activity level following cardiac surgery. *Journal of Advanced Nursing, 15,* 1132-1138.	*Purpose:* To determine effect of in-patient education and telephone teaching and monitoring on efficacy expectations at 12 and 24 weeks. *Design:* Two group experimental design; "standard" care and "standard" + "Working together toward Recovery", nurse counselling, and weekly telephone calls for monitoring, reinforcing , coaching, and reassurance. Data related to efficacy assessments and activity levels collected at 4, 8, 12, and 24 weeks. Theoretical *framework:* Self efficacy.	156 patients together with family members. 125 male and 31 female patients. CABS or re-do CABS accounted for 72% of the males; valvular heart disease accounted for 71% of the female patients. Mean age for males = 59.2 years and for females = 57.0 years. 5% attrition over 24 weeks.	All subjects were interviewed before surgery to obtain efficacy assessments for walking, climbing, lifting and general activity. *Self-efficacy expectations* were assessed on a scale of 0 to 10 to rate confidence in ability to carry out the activity. *Patient self-report of physical activities:* 'yes' responses were summed to provide a total activity score. *POMS:* vigor and fatigue subscales.	Internal consistency for each efficacy scale was estimated at each data collection point and ranged from .99 to .70. Internal consistency of self-reported activity ranged from .98 to .66. POMS internal consistency coefficients ranged from .82 to .94 in the first trial, and from .93 to .70 in this trial.	*T*- tests were used to describe difference in treatment groups at each time period. Repeated measures mixed effects ANCOVA using baseline values as covariates. Multiple regression was used to assess the contribution of disease and demographic variables, treatment status, self-efficacy and mood state to the treatment outcome of self reported activity.	Self-efficacy expectations correlated with self-reported activity at all measurement times (r = .36 to .39, p < .05) except general activity at 24 weeks (r = .17, *ns*). All self-efficacy expectations for all patients increased over time. Vigor (from POMS) correlated well (r = .44 to .17) with self-efficacy for physical activity at all time points. The best regression model explaining 31% of the variance in 24 week self-reported activity included: demographics (F = 3.91; R^2 = .09), baseline activity (F = 1.53; R^2 Δ = .009)), NYHA class at 8 weeks (F = 19.63, R^2 change = .11), summed self-efficacy at 8 weeks (F =4.48; R^2 Δ = .08), and POMS global score at 4 weeks (F = .90; R^2 Δ = .01)	The "bottom line" seems to me, that a cognitive variable (amenable to change by nursing intervention) is an important predictor of physical activity after CABS. If self-efficacy expectations and activity are mutually reinforcing, I would expect them to be highly correlated, as they are. It is unclear if this sample includes some from earlier reports.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Gortner, S. R., Rankin, S. H., & Wolfe, M. M. (1988). Elders' recovery from cardiac surgery. *Progress in Cardiovascular Nursing, 3*, 54-55.	*Purpose:* To test the effectiveness of a psycho-educational intervention to improve posthospital recovery and rehabilitation. *Design:* Randomized clinical trial. *Theoretical framework:* Self-efficacy and family stress theory. *Intervention:* standard teaching plus an experimental tape, a counselling session, and nurse initiated telephone calls during the at-home recovery period. Calls were conducted for data collection, coaching, and monitoring recovery.	Part of larger "Improving Recovery" study. This report is limited to 11 white subjects age 70-77 years. 10 males; 7 CABS, 3 valve replacement, and 1 combined procedure.	Family APGAR; Family Inventory of Resources for Management (FIRM); Marital Satisfaction (MAS); Expected benefits; Self-efficacy appraisal . Self-reports of risk factor management Profile of Mood States (POMS)	*Family APGAR:* Cronbach's alpha = .83 to .87. *FIRM:* Cronbach's alpha > .89. *MAS:* Cronbach's alpha = .73 to .81. *Self-efficacy scales* provided internal reliability coefficients from .58 to .98 at 12 weeks and .71 to .96 at 24 weeks. *POMS:* Cronbach's alphas = .79 to .94. The author's do not report psychometric data, sensitivity of measures, or evidence for validity of the measures from other studies.	Descriptive statistics with ANOVA used for comparisons between groups.	Subjects ≥ 70 years of age had more severe CHD by NYHA class than those <70 years ($F =$ 3.07, $p = .05$). Fatigue persisted longer than for the younger group (statistics not presented). Spouses of older patients in general reported more fatigue than did younger (< 50 years) spouses. In a 66-77 year old cohort, atrial fibrillation was more frequent than in younger age cohorts ($\chi^2 = 6.47$, $p = .04$). Older patients had significantly lower scores on the POMS subscale for anger/hostility than did younger patients ($F =$ 5.70, $p = .01$). Older subjects in contrast to younger viewed surgery primarily as a means of increasing longevity and enhancing quality of life.	Small sample siznecessitates treating these findings as "suggestive" pending further study. Mean scores on POMS for healthy older adults is less than that of younger adults.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Guarnera, S. & Williams, R. L. (1987). Optimism and locus of control for health and affiliation among elderly adults. *Journal of Gerontology, 42*, 594-595.	*Purpose:* To explore the level of optimism among elderly persons and the relationship between optimism and locus of control in the health and interpersonal areas. *Design:* Cross sectional survey.	92 mentally alert volunteers from an elderly retirement community. Ages ranged from 69 to 100 (M = 84), 66 males, 22 females and 4 missing data for gender.	Life Orientation Test (LOT); Multidimensional-Multiattributional Causality Affiliation Scale (MMC-AF); Multidimensional Health Locus of Control Scale (MHLC).	Not reported.	Descriptive statistics and correlations.	The LOT was related to the internal Health Locus of Control (r = .34, p < .001), Chance Health Locus of Control (r = -.21, p < .05), the Effort Affiliation subscale (r = .20, p < .05) the External Affiliation subscale (r = -.21, p < .05), and the Luck Affiliation subscale (r = -.21, p < .05). Thus, 5 of 9 comparisons yielded significant relationships. Neither age nor sex correlated with the optimism measures. With the LOT as the dependent variable, 25% of the variance was accounted for by internal locus of control, chance, effort, and luck. The mean optimism scores for this sample of retired individuals were similar to normative means based on college students.	Brief report did not report internal consistency scores for the LOT with older people.

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Gulanick, M., Kim, M. & Holm, K. (1991). Resumption of home activities following cardiac events. *Progress in Cardiovascular Nursing, 6*, 21-28.	*Purpose:* Purpose of this paper is to describe patterns of activity resumption during early at home recovery, and to present a home activity assessment tool for assessing patient education needs. *Design:* Descriptive, longitudinal with repeated measures. Subjects completed the questionnaire at the time of discharge, and at 4 and 9 weeks post discharge. *Theoretical Framework:* Bandura's social cognitive theory and his derived self-efficacy theory.	40 patients recovering from recent MI, CABS, or MI with PTCA. 28 subjects were male, 30 were married, with a mean age of 57 years. Eligibility criteria selected a sample of uncomplicated, motivated patients. All subjects were interviewed and completed questionnaires about their resumption of activities at home.	*Self-efficacy scales:* scales developed for this study, for walking, climbing stairs, lifting objects, doing household chores, participating in social visits, sexual activity, and driving. 5 point confidence response option. *Performance scales:* Same activities, response with actual ability.	The reliability and validity of the questionnaire scales has been reported elsewhere. Test-retest reliability was > .87 for six of the seven categories. All categories except social had internal consistency coeffficients of .93 or above.	Description and frequencies.	Self-efficacy scores for every activity were ↑ at 4 weeks, and ↑ further at 9 weeks. Performance scores were ↓ at 4 weeks but ↑ at 9 weeks. At 4 weeks, most subjects had returned to preillness walking level (about 5 blocks). At 9 weeks, all were walking at least 1 mile or greater than preillness. At 4 weeks, subjects reported a slight ↓ in stair climbing that was normal at 9 weeks. At discharge all felt confident in performing household chores requiring 2-4 METS; by 4 weeks this had ↑, and at 9 weeks most subjects felt they could perform heavy household chores. Performance did not match confidence levels.	Sample bias for uncomplicated, highly motivated patients. (Same sample as reported in *Heart & Lung*, participation rate = 16.2%).

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Gundle, M. J., Reeves, B. R., Tate, S., Raft, D., & McLaurin, L. P. (1980). Psychosocial outcome after coronary artery surgery. *American Journal of Psychiatry, 137,* 1591-1594.	*Purpose:* To describe psychosocial adaptation after CABS and to identify preoperative factors associated with good outcome. *Design:* descriptive, correlational, longitudinal design. *Theoretical framework:* Quality of life. Expanded previously used measures of QOL (work status and relief of angina) to include sexual and adaptive ego functioning. Used composite data.	Screened 192 cardiac cath patients with psychological testing and psychiatric interview; 35 subsequently underwent CABS and 30 returned for psychosocial and cardiology follow-up. The group consisted of 24 males and 6 females; mean age at operation = 51.4 ± 7.1 years. Setting. North Carolina Memorial Hospital, subjects were from rural North Carolina, an economically impoverished area.	*SCL-90:* self-administered psychiatric symptom inventory. *Preop Psychiatric Interview:* duration of angina, Type A or non-Type A behavior, work status, and sexual functioning. *Postop (12-24 mos.) psychiatric interview:* work status, sexual functioning, emotional and social adaptations since surgery. Each patient was scored on the Adaptive Balance Profile (ABP) and the Psychosocial Adjustment to Illness Scale (PAIS).	Not addressed. In discussing their findings the authors noted that psychiatric symptomatology was revealed in psychiatric interview that was not reported on the SCL-90.	The relationship of preoperative variables (presence of psychiatric symptoms, behavior pattern, and duration of cardiac symptoms) to psychosocial outcome (ABS, PAIS, sexual function, work status, psychiatric symptoms) was examined using chi-square analysis. Eight months was chosen as the dividing point between short and long durations of symptoms on the basis of clinical experience and the distribution of the ABP and PAIS scores.	26/30 patients had ETT which demonstrated reasonably good physiologic outcome. Unemployment and sexual impotence were reported by 83% and 57% respectively. Employment at follow-up was associated with preop duration of symptoms (χ^2 =4.8, *df* = 1), behavior pattern (χ^2 =4.6, *df* = 1) and preop work status (McNemar's test, $p < .01$). Postop sexual function was associated with duration of symptoms (χ^2 = 16.0, *df* = 1) and preop sexual status. PAIS and ABS were the best overall measures of psychosocial outcome and were correlated ($r = .66$, $p < .001$). Each was sig. associated with preop duration of symptoms only (*t* - test). Age did not vary across subgroups.	Small sample; findings represent lower socioeconomic class (both a strength and a weakness). Low employment rate (17%) may be due to lower socio-economic level of subjects, level of exertion is a limiting factor in blue collar jobs.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Hilgenberg, C., & Crowley, C. (1987). Changes in family patterns after a myocardial infarction. *Home Healthcare Nurse*, *5*, 26-35.	*Purpose:* To explore the impact of a myocardial infarction on family members. *Design:* Descriptive, exploratory. *Theoretical Framework:* systems theory.	Sample included 16 male and 9 female patients 2-3 months after a first MI and members of their families. Patient age ranged from 34 to 81 years (M= 54.9 years); spouse age ranged from 29 to 82 years (M = 52.1 years); and child (n = 14) age ranged from 8 to 38 years. Family members were interviewed simultaneously in private.	Open-ended interview asked the respondent to describe life changes after an MI in the areas of family, social, job, and extended family.	The interview guide was developed after literature review and pilot tested with revision. Interview data were transcribed manually at the time of interview and later typed for the data analysis. Data were coded by one investigator, subject to confirmation by other investigators.	Data reduction was accomplished by arranging data into broad categories, then more detailed categories. Categorized responses were compared across categories and within categories. The units of analysis were patients, spouses, and children. Common themes and patterns were identified.	Patients, spouses, and children all reported changes in family and social activities. Half of the patients reported some depression. Spouses and patients both expressed fear of death or another heart attack. Spouses described patients as being moody, quick tempered, and complaining. Children described patients as more irritable and the spouses as worried or easily upset. Patients were aware that their spouses and children were not telling them everything. Dietary changes were difficult for both patients and spouses. Financial change was a significant issue for most families. The majority of patients reported that their family sought to protect them in some way, and several said that their friends were protective.	Well done study, nicely reported.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Hirschfeld, M. (1983). Homecare versus institutionalization: Family caregiving and senile brain disease. *International Journal of Nursing Studies, 20,* 23-32.	*Purpose:* To explore factors influencing a family to continue living with and caring for an old person with irreversible senile brain disease, versus those leading a family to consider institutionalization *Design:* Exploratory study, used both qualitative and quantitative methods.	Nonrandom sample of 30 demented elderly and their 30 family caregivers (CG) living in an urban area in the Western United States. Age of the impaired person ranged from 59-92 years (*M* = 80) and caregivers from 45-88 (*M* = 69). Caregivers were 73% female, and related to the care receiver as spouse (2.3) or child (1/3).	OARS Multidimensional Functional Assessment Questionnaire (OMFAQ); In-depth focused interviews with the cognitively impaired person and with the supportive family member. Participant observation during data collection.	Not addressed; OARS well known, commonly used.	OMFAQ data were processed according to directions. In addition, scales were constructed for morale, tension, management ability, mutuality after selecting items for face validity. Item scores were converted to z-scores weighted by the factor score coefficient for the first factor and summed. Qualitative data were analyzed by content analysis.	Mutuality between the supportive and the impaired family members emerged as the major parameter for families. It grew out of the CG's ability to find gratification in the relationship with the impaired person and meaning from the caregiving situation ...and the CG's ability to perceive the impaired person as reciprocating by virtue of his or her existence. Dyads fell into 4 nearly equal groups: 2 high mutuality, low mutuality; and no mutuality. None of the social, demographic or health impairment characteristics of either the impaired or supportive member influenced the decision to consider institutionalization. Mutuality influenced the CG's attitude toward institutionalization (r = -.90), CG management ability (r = -.56), CG morale (r = -.42), and CG tension (r = .71).	Scale construction based on face validity. Interesting positive correlation between CG tension and mutuality. Might imply that more mutuality associated with doing more and greater health risk for CGs.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Hlatky, M. A., Boineau, R. E., Higginbotham, M. B., Lee, K. L., Mark, D. B., Califf, R. M., Cobb, F. R., & Pryor, D. B. (1989). A brief self-administered questionnaire to determine functional capacity (The Duke Activity Status Index). *American Journal of Cardiology, 63*, 651-654.	*Purpose*: To develop a brief, self-administered questionnaire that accurately measures functional capacity and aspects of quality of life. *Design*: Instrument development and testing. Two phases are reported: 1. initial development with group of patients undergoing maximal exercise testing; 2. used a second independent sample of patients.	Phase I: 50 consecutive subjects undergoing graded exercise testing with measurement of peak oxygen uptake. Phase 2: 50 subjects undergoing exercise testing with measurement of oxygen uptake.	Phase 1: Structured interview used to determine the subject's ability to perform a range of activities. Maximal exercise testing with determination of peak oxygen uptake. Phase 2: DASI, Canadian Cardiovascular Society Functional Classification, Specific Activity Scale, and maximal exercise testing.	Oxygen uptake was considered the "gold standard" and activites for the DASI were select to maximize correlation with oxygen uptake. Spheres of activity included: personal care, ambulation, household tasks, sexual function and recreation. Weighting of items was based on the known metabolic cost of each activity in METS.	Phase 1: Within each sphere of activity, MR analysis was used to identify the activities that best correlated with peak oxygen uptake. These items were then used in MR analysis to determine which of them contributed independent information about peak oxygen uptake. Phase 2: Correlation of each functional activity scale with peak oxygen uptake using Spearman correlation coefficients.	Phase 1: Final index included 12 activities reflecting personal care, ambulation, household tasks, sexual function and recreational activities. The greatest amount of information was conveyed by ability to perform activities easily. Spearman correlation of the DASI with peak oxygen uptake = 0.81 ($p < .0001$), Canadian C-V Society Classification (.58, $p < .0001$) and Specific Activity Scale (.67, $p < .0001$) correlated with peak oxygen uptake. Phase 2: Correlations of all functional capacity measures with peak oxygen uptake were lower with the self administered questionnaire. Peak oxygen correlation with DASI = .58, with CCS = .49, with SAS = .30. Scoring of DASI results in a continuous measurement.	Small number of subjects in the validation phase ($N = 50$). Subjects were assessed at only one point in time, thus the sensitivity of the instrument is unknown. All 3 functional measures (including DASI) had poor correlations with measured exercise capacity in patients with peak oxygen uptake < 5 METS. An additional related limitation, no information is provided about the relative stability of scores.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Jenkins, C. D., Stanton, B. A., Savageau, J. A., Denlinger, P. & Klein, M. D. (1983). Coronary artery bypass surgery: Physical, psychological, social, and economic outcomes six months later. *JAMA, 250,* 782-788.	*Purpose:* To describe the course of recovery and rehabilitation after major heart surgery and to discover predictors of positive outcomes. *Design:* Prospective, longitudinal design. *Theoretical framework:* Quality of life: domains of health include - social, interpersonal, psychological, physical, and biological health. Criteria related to quality in each of these domains include - feelings or symptoms, functions or abilities, and futures or prognosis.	318 subjects (268 males) after first elective CABG. Age 32-69 years, with a mean age of 54.4 years. 13% attrition over 6 months.	Medical history, smoking, exercise, diet, sleep problems, life stress, physical function, family and social life, attitudes, satisfactions, and expectations for activities. Trailmaking Test, visual reproduction and logical memory subtests of the Wechsler. POMS, STAI, scales for well-being, self-esteem, hopelessness, dependency, locus of control, willingness to accept help, and other psychological constructs.	New and abbreviated scales were tested for psychometric adequacy by means of factor analysis of preoperative data and restructured when necessary. No data are provided about how any of the instruments performed in previous studies.	Descriptive statistics, frequencies, paired t-tests, and chi-square analysis.	Angina was completely relieved for 69% to 85% of persons, disability days were reduced more than 80%. 75% of patients had returned to work by 6 months. Anxiety, depression, fatigue, and sleep problems declined from before to after surgery. Vigor and well-being scores rose significantly. For none of more than 60 outcome variables was widespread worsening found. The findings suggest that the great majority of patients are able to resume normal economic and social functioning within 6 months after CABS.	Sample limited to a relatively healthy subset of younger patients undergoing first CABS or CVR, without co-morbidities.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Jenkins, C. D., Stanton, B. A., Savageau, J. A., Ockene, I., Denlinger, P. & Klein, M. D. (1983). Physical, psychologic, social, and economic outcomes after cardiac valve surgery. *Archives of Internal Medicine, 143,* 2107-2113.	*Purpose*: To describe the quality of life and recovery in subjects after cardiac valve surgery. *Design*: Part of the recovery study, a prospective, longitudinal study of patients recovering from OHS. *Theoretical framework*: Quality of Life– includes psychologic well-being and interpersonal harmony as well as relief of symptoms, restoration of physical functioning, resumption of social responsibilities and return to work.	89 patients from 4 university affiliated hospitals in the North East undergoing valve or combination valve and CABS. Patients undergoing combination procedures were older (*M* = 62.4 years) than subjects undergoing valve surgery alone (*M* =54.6 years). 39% of the valve patients were women vs. 16% of the valve + CABS. CVR patients reported longer periods of symptoms prior to surgery (*M*= 8.6 vs 3.6 years). 14% attrition over 6 months.	*Outcomes*: biomedical, psycho-neurological, psychological, physical activity, role function, family and marital relationships, social interaction, and economic circumstances. *Predictors and modifiers*: locus of control, psychosocial supports and recent stressful life events, past medical history, dosages of medications, cardiac catheterization results, details of the surgical procedure, complications, length of	Psychometric adequacy of new measures was assessed by factor analysis of presurgical data and restructured when necessary. Data verification included logical editing of all completed protocols, blind duplication of hospital chart abstracts, and computer editing of all questionnaires and forms. Findings in the study that the measures performed as predicted provides evidence of construct validity.	Analysis used percentages, and paired *t* tests for pre to postsurgical comparisons. Recovery profiles were developed with individual scores in: biomedical outcomes, psychoneurological function, psychological states, physical activity, role functions, family and marital relationships, social interaction, and economic circumstances.	In the first 6 months, 24% were hospitalized, most due to cardiac or incisional problems; 53% made "extra" physician visits; 44% reported fatigue or weakness; 39%, sadness, depression or crying; 39%, feeling worried or afraid; 36% having difficulty accepting ↓ activity. Overall physical activity was unchanged from pre- to postsurgery; there was a general movement from both heavy exertion and inactivity to mild daily activity. Physical recovery was faster than expected for 66%; psychologic recovery matched expectations. No psychoneurological scores ↓ from preop levels. Significant ↓ state anxiety, depression and trouble sleeping, significant ↑ vigor. State anxiety and POMS scores were within norms. First 2 months after surgery were most often difficult. 36%	Relatively healthy subset of the valve population. Low percentage of negative outcomes on all indicators.

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			hospital stay, and discharge medications.			reported ↑ tasks performed in the home, 19% ↓, and the remainder unchanged. No change in tasks performed outside the home. 58% reported no change in family or marital relationships; 40%, brought the family closer together; 28%, over-protectiveness. 65% of subjects < 65 years were employed preop and 62% of these returned to work (9% of those who had been unemployed returned to work). Mdn. time of return to work = 4 months. Financial questions had the lowest response rate; 74% gave income and 86% told of postop ↓ in income. Significant ↓ was seen in subjects with preop income < $20,000. Marked similarity between valve and CABS patient on most indexes of functional recovery, physical symptom relief, and psychologic state.	

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Johnson, C. L. (1985). The impact of illness on late-life marriages. *Journal of Marriage and the Family, 47*, 165-172.	*Purpose:* To explore the impact of acute illness of one member on the older dyad. *Design:* Descriptive exploratory. Combined qualitative and quantitative methods.	Total sample = 167 posthospitalized individuals age ≥ 65 years. Analysis is limited to 76 older dyads in which the spouse was the primary caregiver. Approximately half were middle or upper class and half working or lower class. Sample was limited to Catholics or Protestants of European origin. 70% of the couples were interviewed again 8 months later.	*Quantitative measures:* Activities of Daily Living Scale, a list of social supports was used to elicit the frequencies of help from a spouse or other relatives. *Quality of marriage:* assessed on the dimensions of: satisfaction, extent of conflict, shared interests and activities, power distribution, and emotional interdependence. Additional open-ended questions specific to the acute illness episode and change in the dependency of one spouse were included.	Characteristics of the qualitative measures were not discussed. Interviews were coded by two raters. The coders used the entire interview to arrive at an evaluation of marital quality to lessen the possibility of socially desirable or conventional responses. Little variation was found among the dimensions of marital quality.	Sample description, cross tabulations with chi-square analysis. Two coders rated each interview to determine marital quality.	In general, older dyads expressed high contentment and an absence of conflict, but there was little emotionality in their descriptions of their marriages. Respondents evaluated the quality of their marriage based on: survivorship, shared experiences, traditionalism, and interdependence. Postdischarge conflict stemmed from fear of spouse's death and associated feelings of loss and abandonment. There was competition for the sick role. Major impairment and gender (being female) was associated with more strain. Marriages did not differ by level of impairment. When compared to the widows, the marrieds were more isolated from family and friends and the couples tended to satisfy each other's needs with little outside help.	Methods are not well described. For example, it is not clear if dyads were interviewed together or individually.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Jollis, J. G., Lam. L. C., Smith, R., Smith, P. K., Pryor, D. B., & Mark, D. B. (1991). Length of hospital stay after coronary artery bypass is predicted by a simple preoperative comorbidity score. *Circulation, 84*, II-464.	*Purpose:* To determine if differences in comorbidity are related to surgical length of stay.	436 patients undergoing coronary bypass surgery.	Analysis used the Charlson comorbidity index.	Not addressed.	Frequencies and a multivariate analysis.	57% of patients had 1 or more comorbid conditions including: diabetes, cerebrovascular disease, malignancy, chronic lung disease and chronic renal disease. Length of stay increased with higher Charlson index score. In an analysis that included age, sex, ejection fraction and amount of coronary artery disease, the Charlson index was the second most significant predictor of length of stay behind age.	Poster presented at AHA; limited information available.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Jollis, J. G., Lam, L. C., Shaw, L. K., Pryor, D. B., & Mark, D. B. (1992). Comorbidity reduces referral of women for bypass surgery and coronary angioplasty. *Circulation, 86,* I-718.	*Purpose:* To determine whether differences in illness severity including comorbidity could explain discrepancies in CABS rates between men and women. *Design:* Descriptive correlational.	1,471 patients (412 women, 1,059 men) who underwent initial cardiac catheterization at Duke. Mean age for women = 63.6 years; mean age for men = 59.9 years.	Charlson Comorbidity Index (CCI). Clinical data from cardiac catheterization.	Not addressed.	Not described. Proportions and logistic regression reported.	Women had more comorbidity, more advanced age, higher ejection fraction, and less severe coronary heart disease than men. For both sexes a smaller proportion of patients undergoing revascularization had significant comorbid illness (female 42.5% vs. 59.8%, $p < .0001$; male 41.8% vs. 44.8%, $p < .0001$). In logistic regression analysis, less comorbid illness ($p < .0001$), more severe coronary heart disease ($p < .0001$), and higher ejection fraction ($p < .0001$) were predictive of revascularization within 60 days, while gender was not ($p = .97$).	Poster presented at AHA, 1992; limited information.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Kaye, J. M., Lawton, M. P., Gitlin, L. N., Kleban, M. H., Windsor, L. A. & Kaye, D. (1988). Older people's performance on the Profile of Mood States (POMS). *Clinical Gerontologist, 7*, 35-56.	*Purpose:* To test the feasibility of using the POMS with older people; To examine the psychometric properties of the POMS with older adults. *Design:* Exploratory correlational design.	505 people age 65 or older who were originally recruited for a study of urinary tract infection. Subjects included community dwelling and nursing home residents.	Profile of Mood States: 65 adjective scale. *Measures of functional status:* Physical Self-Maintenance Scale (PSMS), Kahn-Goldfarb Mental Status Questionnaire (MSQ), Affect Balance Scale (Bradburn).		Exploratory factor analysis, with 6 factor oblique rotation.	Majority of older people completed the test without difficulty. Time for administration = 15-20 minutes. The 6 factors explained 82% of the total variance. Only 3 items evidenced loading ≥ .40 on a factor other than its primary factor. Correlations among the original POMS factor score composites and older sample's composites ranged from .83 (confusion) to 1.00 (anger and vigor). There was a slight trend for women to be more fatigued and tense, but less angry than men. Older subjects were slightly more depressed and much less vigorous than younger subjects. Better educated subjects showed less tension and depression. Correlations with the Affect Balance Scale showed the predicted relationships. Correlations with MSQ and PSMS were nonsignificant.	A large majority of the subjects approached in the nursing home were unable to complete the POMS (87/106). The cognitively intact, healthier group had no difficulty with it. Only 9 protocols had to be discarded due to missing data. There was minimal variability on the MSQ and PSMS of those completing the POMS.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
King, K. B., Clark, P. C. & Hicks, G. L. (1992). Patterns of referral and recovery in women and men undergoing coronary artery bypass grafting. *American Journal of Cardiology, 69*, 179-182.	*Purpose:* To characterize preoperative status in a group of women undergoing CABS compared with an equal number of age-matched men, and To identify relations between factors before and after surgery. *Design:* Matched group, descriptive, correlational.	465 women who underwent first time, isolated CABS and 465 age-matched men. Patients were predominantly white (97%). Fewer women than men were married (57 vs 88%; $p < .001$), with most single women being widowed (29%).	Hospital record review: demographic data, number of comorbidities, risk factors, and medications at admission and discharge; perioperative data, body surface area, and postoperative complications.	Clinical data, reliability and validity not addressed. Standard data collection form was employed by two trained reviewers.	Paired samples *t* tests, chi-square analysis, multivariate comparisons using logistic regression. Standard MR were used when body surface area was the dependent variable.	Women had higher incidences of cardiac risk factors than did men. No difference between women and men in total incidence of MI; however, women had a higher incidence of acute MI. In-hospital mortality rates were not significantly different between men and women. Mortality rate for women was 4.3%. For all subjects, emergency surgery ($p < .001$), significant LM narrowing ($p < .05$) and renal disease ($p < .001$) were related to death, whereas history of MI ($p < .05$) and diabetes ($p < .05$) were related to death in men only. After surgery, men had a higher incidence of atrial arrhythmias ($p < .001$) and women a higher incidence of CHF ($p < .0001$).	Sample was homogeneous for race, data regarding ventricular ejection fraction was not available, therefore data regarding higher incidence of CHF in women after surgery are limited.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Kos-Munson, B. A., Alexander, L. D., Hinthorn, P. A. C., Gallagher, E. L., Goetze, C. M. (1988). Psychosocial predictors of optimal rehabilitation post-coronary artery bypass surgery. *Scholarly Inquiry for Nursing Practice: An International Journal, 2*, 171-193.	*Purpose:* To determine the relationship between patient preoperative perceptual/ cognitive/ demographic variables and self-perceived level of rehabilitation 6 months and 1 year after CABS. *Design:* Prospective, longitudinal. *Theoretical framework:* Perceptual, psychological theory.	A total of 106 patients were recruited and 92 patients (86.8%) completed all phases. Sample was 84% male, from 35 to 64 (*M* = 55 years); almost exclusively white. 80% were employed FT, at the time of surgery; 11% were working PT; 8% were FT homemakers. 13.2% attrition from surgery to1 year follow-up.	*Personal orientation inventory* (POI): to measure self-actualization; *Self-rating Depression Scale* (SDS); *Cognitive level analogy test* (CLAT): conceptual ability; *Semantic differential for health* (SDH): perception of cardiac illness; *Valuing of work index* (VWI); *Jenkins Activity Survey*: personality or behavioral style used to classify Type A behavior. *Sickness Impact Profile* (SIP): perceived impact of illness on daily life.	*POI:* test-retest reliability, .77 and .71. *SDS:* split half reliability, .81; concurrent validity with MMPI, *r* = .70, with Hamilton Physician-Rating Depression Scale, *r* = .79. *CLAT:* split half reliability, .83. *VWI:* Cronbach's alpha = .84; concurrent validity with attitude toward work, *r* = .39, with POI, *r* = .25, with income, *r* = .30. *SIP:* test-retest reliability, .88; Concurrent validity with patients' assessment of illness, *r* = .54 and with physicians estimate of illness, *r* = .49 in the Seattle Study of Cardiac Patients.	Descriptive statistics; multiple regression to establish the predictive value of the variables studied; bivariate correlations of all variables.	28% had ratings consistent with clinical depression preoperatively by SDS score. 51% were Type A by Jenkins Activity Scale; low mean scores (< 50%) on self actualization measures; 22% of subjects fell into the devastated cognitive ability class. Variables of perception of illness, work, personality style, level of self-actualization, depression, cognitive ability and the demographic variables of age, education, and income were regressed on perceived impact of illness on daily living (SIP). Only depression (28.9%) and income (6%) were significant predictors of SIP score. *T*-test comparing SIP scores by gender, showed that men did significantly better (lower SIP scores) than women. Pre- to postoperative depression were scores significantly correlated, r = .55, *p*< 000.	Reported postoperative comparisons by gender, preoperative comparisons are not reported. Maximum possible score on SIP = 145, range in this study 1 to 34 with mean =5.18. Higher scores on SIP indicate greater impairment. Biological factors influencing recovery are not controlled.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Krumholz, H. M., Douglas, P. S., Lauer, M. S. & Pasternak, R. C. (1992). Selection of patients for coronary angiography and coronary revascularization early after myocardial infarction: Is there evidence for a gender bias? *Annals of Internal Medicine, 116*, 785-790.	*Purpose:* To determine whether a gender bias exists in the selection of patients for diagnostic and therapeutic cardiovascular procedures early after MI. *Design:* Retrospective cohort study.	2,473 consecutive patients with a discharge diagnosis of acute MI and a peak CK-MB of at least 4%. 1,350 men and 1,123 women; in younger groups most patients were men, in 70-79 age equal rate in men and women, over 80 women exceeded men.	Clinical data retreived from the hospital's computerized data base.	Not addressed.	Patients were stratified by age group (30 to 59 yrs., 60 to 69 yrs., 70 to 79 yrs., and ≥ 80 yrs.); categorized as LV ≥ 50% or < 50%, and as severe CAD (LMCA stenosis ≥ 50%, and 3 vessel disease). Chi square analysis compared rates of procedures in men and women. Comparisons controlling for age and age and severity of CAD were done using the Mantel-Haenszel estimator. Student's *t*-test was used to compare MB fractions for each age category.	Overall frequency of coronary angiography was less for women than for men. Age adjusted frequencies were not significantly different. Overall, 35% of the patients had an LVEF < 50%, and after controlling for age there was no difference between men and women. The proportion of patients with severe CAD increased with age in both sexes; after controlling for age, fewer women than men had severe coronary artery disease. After controlling for age and severity of CAD, no significant difference in the rate of PTCA for men and women. Women were less likely than men to be referred for CABS, after controlling for age these differences became more significant. Men were more likely to be referred for bypass after PTCA.	Because women develop heart disease an average of 10 years later than men, I am not sure controlling for age is appropriate. Control for severity of coronary artery disease was based on interpretation of angiograms. The cardiologists were not blind to gender. Study addressed women who made it to catheterization; gender bias in referral may exist. Given different incidence of MI in males and females the time of subject recruitment may have been different.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Kulik, J. A., & Mahler, H. I. M. (1989). Social support and recovery from surgery. *Health Psychology, 8*, 221-238.	*Purpose:* To examine the separate and interactive relationships that in-hospital spouse support and general marital quality have with psychological, behavioral, and physical measures of recovery after CABS. *Design:* Between subjects, nonexperimental. *Hypothesized relationships:* ↑ spousal support and ↑ quality of the marital relationship --> ↓ anxiety and smoother, faster recovery. Interaction between spousal support and quality of the marital relationship.	72 males who underwent nonemergency CABS at the San Diego VA hospital. Excluded patients with other serious medical problems. Age 38-69 years (M = 57.8, SD = 5.98); 90.3% white, education from 7 to 18 years, 41.7% retired, 15.3% semi-skilled labor, 11.1% skilled labor, and the remainder were approximately evenly divided among professional, managerial, sales, and clerical positions. Approximately 70% of the sample lived outside San Diego County.	*Baseline:* LVEF, DM, HTN, # of grafts placed, and smoking. *Marital relationship:* single item rating of quality. *Hospital support:* # of days visited ÷ total # of hospital days. *Preop anxiety:* 7 items from the STAI, nurse observations, and # of anxiolytic meds. *Postop pain:* # of times pain med taken. *Postop ambulation:* Monitored activity on the POD 4-6 and averaged scores. *Speed of recovery:* hrs in ICU and postop LOS.	*Hospital support:* assessed by direct observation or by casual inquiry. *7 item STAI* has been shown to provide valid measures of state anxiety. The separate indices of preoperative anxiety were only moderately interrelated (Alpha = .52). *Activity monitor:* sensitive to 10 degree tilt off horizontal. Device has been shown to provide a highly reliable and valid measure of physical activity. *Marital quality:* single item measures of marital quality have been found to correlate highly with multi-item scales of marital satisfaction.	2 x 2 (marital quality x hospital support) contingency analysis. MANOVA using all DVs. Two-way ANOVAs using unstable angina and shorter smoking history as covariates. ANOVA examined effects of support on preoperative anxiety, postoperative ambulation, and speed of recovery. Pairwise comparisons to examine internal differences. Similar analyses MR using marital relationship and hospital support as continuous variables.	No significant effects of marital relationship or support on preoperative anxiety or postoperative ambulation. Married, high support patients took fewer pain medications than the low-support and unmarried groups. Married, high-support patients were released from ICU and from hospital sooner than married low-support subjects. Unmarried subjects were released from ICU and from hospital midway between and did not differ significantly from either. Perceived quality of the marital relationship was generally nonsignificant. With respect to ICU release, patients with poor marital relationships benefited more by high versus low support than patients with better relationships. No association between quality of marital relationship and hospital support.	Over 71% reported relationship quality was excellent; all but 1 indicated relationship was at least fair. Frequent presence of the spouse may have influenced the physician's decision making related to hospital discharge. This study can not provide any answers about mechanisms. Support measure was physical presence or visitation. No assessment of perceived supportiveness. Statistical analysis is fairly well described; no mention of control for unequal group sizes.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
LaRue, A., Bank, L., Jarvik, L., & Hetland, M. (1979). Health in old age: How do physicians' ratings and self-ratings compare? *Journal of Gerontology, 34*, 687-691.	*Purpose:* To provide information on the relationship between self-reports of health and physicians' ratings in an aged sample; To determine how both of these measures of health relate to longevity. *Design:* Descriptive, correlational.	69 individual survivors of an initial sample of aged twins. Age ranged from 77 to 93 years with a median age of 84.25 years; 44 were female and 25 male.	Self-report of health: "How would you rate your present health?" with response options of excellent, good, fair or poor. Physical exam findings were rated by a physician who was unaware of the specific purpose of the rating. "Excellent" = no health problems, "good" = minor conditions, "fair " = chronic non-disabling health problems, "poor" = disabling conditions. Two categories of longevity: (a) ≥ 5 years from time of report and (b) < 5 years.	Not addressed; this was a validity study.	Relations between health ratings and longevity were rated separately for male, female, "younger", and "older" subjects. "Older" and "younger" was based on median split. Because of small sample size, grouped good and excellent as "positive" and fair and poor as "negative". Chi-square analysis and Fischer's exact probability test.	62% of subjects rated their own health as "good" or "excellent". Self-ratings were significantly related to 5-year survival among the younger subjects of both sexes, but failed to discriminate survivors from non-survivors in the oldest age group. For women, survival was consistent with self-perception of health in 18 of 23 cases and for men in 12 of 13 cases (Fischer's exact probability test, $p < .05$ and $< .01$ respectively). Physician's ratings of health was significantly correlated with self-report in 44 of 64 cases ($\chi^2[1] = 10.69$, $p < .01$). Physician's ratings were predictive of survival for younger subjects of both sexes, but failed to discriminate survivors from nonsurvivors in the oldest age group.	Limited to Caucasians over the age of 77 years.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Loop, F. D., & Cosgrove, D. M. (1986). Repeat coronary bypass surgery: Selection of cases, surgical risks, and long-term outlook. *Modern Concepts of Cardiovascular Disease, 55,* 31-36.	*Purpose:* To describe the Cleveland Clinic experience with coronary artery reoperation. *Design:* Retrospective case series analysis. Three cohorts: 436 patients who had reoperation from 1967 through 1978; 439 patients from 1979 through 1981; and 625 patients from 1982 through 1984.	1967-1978: 436 patients with mean age at first operation = 49.1, at second operation = 53.3; 8.7% women. 1979-1981: 439 patients with mean age at first operation = 49.7; at second operation = 56.3; 13.2% women. 1982-1984: 625 patients with mean age at first operation = 52.2; at second operation = 58.0; 14.7% women. The interval between operations has increased from 49.6 months to 83.7 months.	Clinical data.	Not addressed.	Descriptive statistics, frequencies, Cox regression.	Young age, no internal mammary graft, and incomplete revascularization at first operation predicted reoperation. Subjects for reoperation had more severe and disabling angina and more extensive and diffuse disease. Angiographic indications (1982-1984) were graft closure (44.3%), progressive atherosclerosis (18.1%), and combined (37.6%). Operative risk factors were severe LMCA disease, progressive or unstable angina, and advanced age. Operative mortality averaged 3.2%; periop MI averaged 8%. Angina relief was less after reoperation. The chance of being free of MI, cardiac-related death, or a third operation was 40% at 3 years, 28% at 5 years, and 26% at 7 years. Overall survival at 5 and 6 years was 88% and 85%.	Retrospective case series analysis.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Loop, F. D., Lytle, B. W., Cosgrove, D. M., Goormastic, M., Taylor, P. C., Golding, L. A. R., Stewart, R. W. & Gill, C. C. (1988). Coronary artery bypass graft surgery in the elderly: Indications and outcome. *Cleveland Clinic Journal of Medicine, 55,* 23-34.	*Purpose:* To describe the Cleveland Clinic experience with coronary revascularization in patients ≥ 65 years of age. *Design:* Retrospective case series analysis. Divided subjects into two cohorts age 65 to 74 and 75 or older. These cohorts were compared to each other and to the cohort of patients < 65 years of age.	5,070 patients over age 65 who underwent primary, elective coronary revascularization from Jan., 1976 through June 1986.	Clinical data.	Not addressed.	Descriptive statistics, frequencies, logistic regression.	Percentage of women increased with advancing age. Moderate to severe angina, DM, PVD and cerebrovascular disease were more frequent in patients ≥ 65 yrs. LMCA disease was twice as frequent in patients ≥ 75 yrs. Overall mortality for patients < 65 yrs = 0.7%, 65-74 yrs = 2.0%, and ≥ 75 yrs = 4.7%. In the 65-74 yr. group, mortality was greater for women than for men (3.0% vs. 1.8%, $p < .01$). Variables associated with increased operative risk: age ≥ 75 years, current cigarette smoking, LV impairment, and female gender. Multisystem failure was implicated in operative mortality with advancing age. Stroke, bleeding that required reoperation, respiratory complications, and renal failure increased significantly with advancing age. Total LOS = 12.4 days for patients < 65 and 13.5 days for patients ≥ 65 (*p*	Retrospective case series analysis. Experience limited to the Cleveland Clinic, a major cardiovascular surgical center. May have better than average results.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
						< .001). Variables predicting being a LOS outlier: amount of blood transfused, stroke, wound infection, respiratory complications, PVD, hospital death, and atrial fibrillation. Angina relief was better in the elderly than in the younger group (p = .0001). Variables predicting long-term survival: number of associated diseases, cardiac enlargement, age 75 and older, postoperative atrial fibrillation, preoperative MI, and PVD. Survival rate of patients in the 65-74 age group was 64.2% compared with an age and gender adjusted rate in the US population of 61.7%. Survival for those ≥ 75 yrs was 53.3% compared with 48.6% for the age and gender adjusted US population.	

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Maynard, C., Litwin, P. E., Martin, J. S., & Weaver, W. D. (1991). Treatment of acute myocardial infarction in women: Results from the MITI registry. *Circulation, 84*, II-231.	*Purpose:* To describe the experience of women within the MITI registry. *Design:* MITI is a randomized clinical trial of thrombolytic agents early in the course of MI. *Theoretical framework:* None specified.	1,659 women with acute MI admitted to Seattle area hospitals.	Clinical data.	Not addressed.	Descriptive statistics; odds ratio. (? *t*-tests)	Women were 9 years older than men (72 ± 12 years *versus* 63 ± 12 years), had more baseline hypertension ($p < .0001$), more CHF ($p < .0001$), less angina ($p < .0001$), and MI ($p < .0001$). Thrombolytic agents were given to 14% of women and 26% of men ($p < .0001$), PTCA to 14% of women and 27% of men ($p < .0001$), and CABS to 8% of women and 11% of men ($p = .007$). After adjusting for key covariates by the logistic model, thrombolytic therapy ($p < .0001$) and PTCA ($p = .01$) were used less in women, but bypass was not. Age adjusted hospital mortality was similar for men and women and for those treated with thrombolytic therapy and/or PTCA. Women who underwent bypass surgery had an increased risk of death (odds ratio = 1.87).	Abstract of a paper presented at AHA Scientific Meetings, 1991. Additional information from the Washington Heart Association newsletter suggests the presentation of MI in women may be different than in men --> delay in diagnosis thus thrombolytic therapy would not be appropriate. Others suggest that this may be a gender bias due to predominance of men in clinical trials. No report of what "key covariates" led to conclusion women were as likely as men to undergo CABS.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Mayou, R., Foster, A., & Williamson, B. (1978). The psychological and social effects of myocardial infarction on wives. *British Medical Journal*, *1*(6119), 699-701.	*Purpose:* To describe quantitatively and comprehensively psychological outcome in men and their wives after myocardial infarction. To examine the influence of wives in determining the quality of outcome for all concerned. *Design:* longitudinal, descriptive correlational. *Theoretical framework:* None specified.	89 men (aged 29-69) with a first MI and 82 wives.	*Semi-structured interview:* husbands and wives interviewed separately in the hospital and at home two months and a year after discharge.	Interviews were tape recorded. The interview procedure and the rating scales were said to be described in detail elsewhere (no reference provided).	Chi-square was used for all statistical analyses.	Wives had substantial and persistent psychological symptoms, and the husbands' illness had continuing effects on their work, leisure and social activities, and family life and marriage. The wives psychosocial disability was comparable to that of the patients. Psychosocial adjustment before the illness and the quality of the marriage and of family life were good predictors of outcome for the wives. The women had a major role in the patient's readjustment during convalescence, and their attitudes and behavior as well as the general quality of family life were important determinants of the rate and extent of patient recovery.	Sexist flavor to this report. Nevertheless, demonstrated importance of wife to recovery after MI. Brief report, made some statements one must assume are data based.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Nelson, C. L., Herndon, J. E., Mark, D. B., Pryor, D. B., Califf, R. M., & Hlatky, M. A. (1991). Relation of clinical and angiographic factors to functional capacity as measured by the Duke Activity Status Index. *American Journal of Cardiology, 68*,973-975.	*Purpose:* To determine if DASI varies in an appropriate fashion according to clinical factors known to influence patient functional status. *Design:* Descriptive correlational.	A cohort of 438 patients who underwent cardiac catheterization at Duke from Mar. 1986 through Feb. 1987 and subsequently had CABS within 6 weeks. The sample was 75% male and the median age was 60 yrs. 109 had one vessel disease, 138 had 2-vessel disease, and 191 had 3 vessel disease. 37% had a history of MI and 7% of CHF.	Duke Activity Status Index (DASI): brief self-administered questionnaire that gauges the patient's ability to perform common activities and uses the responses in a weighted score that assesses overall functional capacity. Clinical data.	Not addressed, although this is a validity study.	Descriptive statistics, linear regression and multiple regression were used to compare the effect of predefined clinical factors on functional capacity.	Activity status was higher in men than women and declined steadily as age increased. Activity status varied with number of diseased vessels. History of MI, LVEF, and presence of CHF were associated with reduced functional capacity. In multivariate analysis age, gender (being female), presence of heart failure, stable angina, diabeters, smoking and 3 vessel disease were significant independent predictors. Once these factors were entered, LVEF and percent stenosis did not add additional explanation. The total R^2 was only .18. Evidence that the DASI is sensitive to differences in clinical disease characteristics.	Brief report. Does not address internal consistency, reproducibility, or sensitivity of the measure to change.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
O'Connor, A. M. (1983). Factors related to the early phase of rehabilitation following aortocoronary bypass surgery. *Research in Nursing & Health, 6*, 107-116.	*Purpose*: To describe differences in physical and psychosocial function prior to and 3 months after CABS. To explore relationships between selected physical, psychosocial, and health care system variables and rehab. outcome. *Design*: cross-sectional, descriptive correlational. *Theoretical frmwrk*: Adjust. is determined by perceived health, physical, psychosocial and health care system variables. Physical, psychosocial and system variables act on adjustment directly and also indirectly through perceived health.	The sample included 30 male patients 3-months post CABS who were enrolled in a Phase II cardiac rehabilitation program. Excluded: females, repeat bypass, or procedures in addition to bypass. Included only those who were scheduled for ETT prior to enrollment. Mean age = 55.5 years.	*Sickness Impact Profile* (SIP): Sleep, rest, emotion, household management, social interaction, recreation, and work function. *Exercise Tolerance Test* (ETT). *Preop Severity of Illness*: angina, # of diseased arteries, LVEF, and perceived severity of symptoms. *Postop*: work, demands of the job (mets), reasons for not working, # and mets of household and leisure activities, perceived health and barriers to rehab.	SIP: validity assessed by comparison with Katz ADL index, clinician assessment of dysfunction, the National Health Interview Survey and self ratings of health status ($r = .46$ to $.61$, $p \leq .05$). Face and content validity of the semi-structured interview schedule was established by a panel of experts. Reliability of the schedule was assessed by checking consistency of responses between the interview schedule, SIP, and the medical record. All interviews were conducted by the same investigator.	McNemar's test for change and the Wilcoxon signed ranks test for differences were used to compare patients pre- and post-operative functioning. Correlations between the physical, psychosocial and health care system variables, postop perception of health, and the rehab. outcome measures were obtained using the contingency coefficient and Kendall's Tau. Variables which were significantly correlated to postop outcomes were entered into the MR equations using stepwise regression.	1.) Spouse's/family's fear of patient injury ($\beta = -.71$, cum $R^2 = .23$, $p < .05$), number of bypass grafts ($\beta = .34$, cum $R^2 = .38$, $p < .05$), and feeling of loss of control ($\beta = -.58$, cum $R^2 = .44$) explained 44% of the variance in postoperative perception of health. 2.) Age ($\beta = -.06$, cum $R^2 = .09$), number of postoperative days ($\beta = .04$, cum $R^2 = .16$), SES ($\beta = .21$, cum $R^2 = .18$), preoperative leisure activities - number ($\beta = .16$, cum $R^2 = .19$), and time off work before surgery ($\beta = .002$, cum $R^2 = .20$) explained 20% of the variance in postoperative exercise tolerance. 3.) Perceived severity of preoperative symptoms ($\beta = .67$, cum $R^2 = .12$), age ($\beta = -.07$, cum $R^2 = .23$), and postoperative perceptions of health ($\beta = .61$, cum $R^2 = .26$) explained 26% of the variance in postoperative household activities in mets. 4.)	Small sample size for complex analysis. Sample limits generalization. SIP may not be sensitive to change after surgery. Cross sectional design asks patients to recall preoperative status approximately three months after surgery.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Peterson, C., Seligman, M. E. P., & Vaillant, G. E. (1988). Pessimistic explanatory style is a risk factor for physical illness: A thirty-five-year longitudinal study. *Journal of Personality and Social Psychology, 55*, 23-27.	*Purpose:* To examine the relationship between explanatory style and health outcomes. *Design:* Longitudinal, correlational. *Theory:* Social cognition.	268 young Harvard men, selected to be the most independent and health individuals. For this investigation, 99 of these subjects chosen arbitrarily according to the first letter of last name.	CAVE technique used to analyze open responses to questions about difficult wartime experiences. Physical health rated by a research internist from serial physical exams by the men's person physicians. Global measure of college soundness evaluated by an examining psychiatrist's estimate of the participant's likelihood of encounter emotional difficulties in the future (1945).	Three components of explanatory style and the composite score had high Cronbach alpha correlations: stability, .85; globality, .77; internality, .90; and the composite, .89.	Not described. Results reported are descriptive and correlational.	Overall, men who explained bad events with stable, global and internal causes at age 25 were less healthy than men who made optimistic explanations. The correlation held even when initial physical and emotional health were held constant. Correlations of explanatory style with health after partialling out health status at age 25 and college soundness were nonsignificant at age 30, 35 and 40. At age 45, the correlation became significant (partial $r = .37$) and remained significant, although decreased magnitude at age 50 (.18), 55 (.22), and 60 (.25).	Nonrepresentative sample; method of selecting this subsample not clearly described question if random. Data not collected for this purpose -- measure of college soundness particularly questionable. CAVE results in measure of explanatory style; a form of content analysis, not described in this article. Used partial versus semipartial correlations.

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						Fear of injury (β = 1.48, cum R^2 = .35, p < .05), fear of recurrent symptoms (β = -.87, cum R^2 = .45) and age (β = -.94, cum R^2 = .48) explained 48% of the variance in postoperative leisure activities in mets. 5.) Preoperative psychosocial functioning (SIP) (β = .25, cum R^2 = .38, p < .05), depression (β =15.17, cum R^2 = .58, p < .05), number of postoperative days (β = -.27, cum R^2 = .63), postoperative perception of health (β = -3.84, cum R^2 = .69, p < .05) and preoperative duration of illness (β = .03, cum R^2 = .71) explained 71% of the variance in postoperative psychosocial functioning (SIP). The variables measured were unable to explain significant amount of the variance in exercise tolerance or postoperative household activities.	

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of the American Geriatrics Society, 23,* 433-441.	*Purpose:* To develop an instrument for the assessment of organic brain deficit in the elderly. *Design:* Instrument development, validity.	997 community-resident persons aged 65 or over, constituting a random stratified-cluster probability sample of approx. 10% of the entire elderly population in Durham County, North Carolina. The SPMSQ has also been used in a study of 141 elderly persons referred for clinical evaluation, and a study of 102 institutional person.	Short portable mental status questionnaire (SPMSQ).	See results.	Error curves were plotted by educational level and by blacks and whites.	Blacks had consistently higher failure rates on all items. Much of this difference can be attributed to educational attainment. Natural cutoffs were derived from the distribution of error curves. The SPMSQ was administered to 2 nonrandom populations. The distribution of error scores shifted to the right for the institutionalized sample, but a full range of scores was obtained. In subjects seen in the OARS clinic, there was 92% agreement between the SPMSQ score and clinical psychiatric interviews. Two groups of subjects were given the SPMSQ at approximately 4-week intervals. Test-retest correlations were 0.82 and 0.83 for the two groups.	

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Rankin, S. H. (1990). Differences in recovery from cardiac surgery: A profile of male and female patients. *Heart & Lung, 19*, 481-485.	*Purpose:* To compare and contrast the biophysical and psychosocial profiles of men and women undergoing cardiac surgery during the perioperative and home recovery period. *Design:* Prospective, cohort design was obtained from a convenience sample of 117 patients undergoing cardiac surgery. Repeated measures preoperatively and 1 and 3 months postoperatively. *Theoretical framework:* Lifespan development theory.	A cohort of 117 patients (93 male) was obtained from a convenience sample of patients undergoing cardiac surgery.	*Biophysical status:* NYHA functional status criteria; self-report of recovery, (Gortner); abstract of the medical record; *Psychosocial status:* POMS.	Psychometric characteristics of measures were not reported.	Data were analyzed using repeated-measures ANOVA, multiple regression, and *t* tests. Qualitative data were collected using a semi-structured tape recorded telephone interview that was analyzed by content analysis techniques.	*Biophysical contrasts:* Women were more functionally compromised due to cardiac disease than were men ($t = -4.04$, $p = .05$). Women showed a trend toward more shortness of breath ($p < .06$) and higher cholesterol levels ($p < .08$) than men. Women had longer ICU stays ($t = -2.49$, $p = .02$), proportionately more women died in surgery and during the first 6 weeks after surgery. Men were more likely to have history of MI ($t = 2.58$, $p = .03$). At 1 and 3 months men and women did not differ significantly on biophysical, sexuality, recreation or return to work variables. *Psychosocial contrasts:* Mood disturbance declined over time on all subscales of the POMS except anger. Women consistently demonstrated less mood disturbance on the POMS subscales.	At baseline, $N =$ 93 males and 24 females. Percent attrition, and numbers at the various measurement points are not described. The author does indicate greater attrition of women due to morbidity and mortality. Incorporated both CABS and CVR to increase proportion of women. There was no indication of controlling for probable age, sex, illness severity association.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Rankin, S. H. (1992). Psychosocial adjustments of coronary artery disease patients and their spouses: Nursing implications. *Nursing Clinics of North America, 27*, 271-284.	*Purpose*: To explore the psychosocial needs and adjustments of patients and their caregiving spouses, with particular attention paid to gender and age differences as they influence adaptation and coping. *Design*: exploratory data analysis from two studies. The first was a longitudinal correlational study of patients and spouses. The second was a follow-up at one year with a subsample of the original couples.	Study 1: 117 cardiac surgery patients and their spouses from 5 northern CA hospitals. Study 2: 44 patients and their spouses one year later.	Profile of mood states (POMS). Kansas Marital Satisfaction scale. Family APGAR. Short Social Support scale. Zarit Caregiving burden.	Not addressed.	Repeated measures ANOVA	Mood disturbance declined over time for both patients and their caregiving spouses (n = 62 subjects, 31 couples). There were no significant differences, but spouses were consistently more distressed than patients. Low levels of marital satisfaction on the part of the spouse preoperatively was associated with high levels of caregiving burden at 3 months after CABS (p = .06). Marital satisfaction and satisfaction with family function declined significantly for both patients and spouses from preoperative levels, although there were no significant differences between patients and spouses (n = 58 subjects, 29 couples). Caregivers were consistently less satisfied than their patient partners.	These data are from Rankin's dissertation study. This report was not truly a research report so details were not available.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Rankin, S. H., & Monahan, P. (1991). Great expectations: Perceived social support in couples experiencing cardiac surgery. *Family Relations, 40,* 297-302.	*Purpose:* To describe the influence of role on perceived social support in situation of cardiac surgery; and, to determine the direct or buffering effects of social support on patient and caregiver reported mood disturbance. *Design:* Prospective longitudinal design with data collection points preoperatively and at 1 and 3 months postoperatively. *Theoretical framework:* Lazarus's stress and coping.	Convenience sample of 117 couples from 5 San Francisco Bay Area hospitals. 94 male and 23 female patients and their spouses. 87% white, age ranged from 25 to 81 years (Patient M = 60.1 years; Spouse M = 58.3 years). Years married ranged from 2-54 years, M = 31 years. 73% high school or above, 58% in three highest occupational classes according to the Hollingshead index. 74% CABS, 23% CVR. 40% attrition by 3 months, final n =70 couples; 40% attrition.	*Social Support Scale (SSS):* perceived support from spouse, children, family and friends. (CGs were not asked about support received from spouse.) *Profile of Mood States (POMS):* total mood disturbance. *Zarit Caregiving Burden Inventory:* stress experienced by CGs. *Cardiac Recovery:* measured by NYHA at 3 months post surgery.	*SSS:* internal consistency for this sample = .65 for patients to .82 for caregivers. *POMS:* Scores for this sample ranged from 31 to 167, and reliabilities ranged from .78 to .94. *Zarit Caregiving Burden Inventory:* Cronbach's alpha in this sample ranged from .82 to .91 over the two time periods with scores ranging from 0 to 47. *NYHA classification:* data related to psychometrics not provided. Mean score at 1 month = 1.34 (*SD* =0.56), mean score at 3 months = 1.30 (*SD* = 0.57).	Data were analyzed using the CRUNCH interactional statistical package and included repeated measures ANOVA and multiple regression procedures.	Patients reported more social support than spouses. No main effects for gender or interactions of gender and time. NYHA status at 1 month predicted mood disturbance (POMS) at 3 months. No main or buffering effects for social support on mood disturbance (POMS) or on physical health (NYHA). Neither patient gender nor length of marriage contributed to mood disturbance. Social support acted as a buffer on health outcomes for spouses. For more caregiving burden, social support reduced CG mood disturbance. At low levels of burden, social support did not influence mood disturbance. The model tested (social support, caregiver burden, and support x burden interaction) explained 49% of the variance in mood disturbance.	NYHA class was conceptualized as both a stressor and as the outcome indicator of cardiac recovery. NYHA did not change significantly between one and three months postoperatively. Logically NYHA would be an insensitive measure of cardiac recovery. Did not control for baseline mood state. Mean mood disturbance scores for patients and CGs were < the mean scores for college students and showed slightly more disturbance than did a sample of healthy older adults.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Rich, M. W., Sandza, J. G., Kleiger, R. E. & Connors, J. P. (1985). Cardiac operations in patients over 80 years of age. *Journal of Thoracic and Cardiovascular Surgery, 90*, 56-60.	*Purpose:* To describe the surgical experience with patients age ≥ 80 years. *Design:* Descriptive, longitudinal. *Method:* Retrospective chart review with follow-up. *Theoretical framework:* None specified.	25 patients age ≥ 80 years undergoing cardiac surgery from January 1980 to June 1983.	Patient age, sex, admitting diagnosis, NYHA functional class, cardiac risk factors, procedure performed, cross-clamp time, postsurgical hospital course and complications and condition at discharge.	Not addressed.	Descriptive statistics and frequencies.	Mean age at operation = 83.1 years. Total hospitalization averaged 28.1 days with postop LOS =19.5 days (range 7 to 74 days). Usual postop LOS = 9.1 days. Indication for operation: chest pain, dyspnea, or both. Most common procedure = AVR with CABS. Postoperative complications in 92% of patients including: SVT, CHF, bleeding, cardiac tamponade, wound dehiscence, transient renal dysfunction, hypotension, sepsis, decubitus ulcers, VT, incontinence, GI bleeding, recurrent chest pain, and mild stroke. 21 of 25 patients were alive with symptomatic improvement at 29.1 months. Preop mean functional class = 3.4; postop = 2.0. Perioperative mortality, 4%.	Retrospective report of a series of patients. Measures of angina frequency and severity are not described. Data collected for clinical purposes.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Riegel, B. J. & Dracup, K. A. (1992). Does overprotection cause cardiac invalidism after acute myocardial infarction? *Heart & Lung, 21*, 529-535.	*Purpose*: To determine if overprotection on the part of the patient's family and friends contributes to the development of cardiac invalidism after acute MI. *Design*: Longitudinal, descriptive survey.	111 patients after a first MI. The sample was 74% male, an average of 61 years old (range 31 to 91 years), and 86% white.	UCLA Social Support Inventory. Self-Perception Inventory for adults (self-esteem). Profile of mood states. General Health Perceptions Questionnaire. Interpersonal Dependency Inventory. Neuroticism subscale of the Eysenck Personality Questionnaire. Coronary Prognostic Index. Specific Activity Survey.	Social support: mean alpha coefficient = .87. Self-esteem: alpha coefficient = .92. Mood: alpha coefficient = .97. Health Perceptions: alpha coefficient = .81. Interpersonal dependency: alpha coefficient = .85. Neuroticism: coefficient alpha = .88. SAS: correlation with duration of treadmill exercise = -.66).	Subjects were categorized as either overprotected or inadequately supported by subtracting the "support desired" subscale from the "support provided" subscale. ANOVA and MANOVA; multiple regression analysis.	Self-esteem differed significantly between groups at 1 month ($F_{(1, 107)}$ = 10.74, p = .001) with overprotected subjects reporting higher self-esteem. At 4 months, the results were not significant but the differences were in a consistent direction. Overprotected subjects were significantly less anxious, depressed, angry, and confused and felt more vigorous than the inadequately supported patients at 1 month. At 4 months, the differences were not significantly different except anger was higher for the inadequately supported subjects. No differences in interpersonal dependency at 1 month; at 4 months emotional reliance on another was significantly higher for inadequately supported subjects when compared with overprotected subjects.	Subjects were either over-protected or inadequately supported; this determination seemed a bit arbitrary.

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Rose, D. M., Gelbfish, J., Jacobowitz, I. J., Kramer, M., Zisbrod, Z., Acinapura, A., Cappabianca, P. & Cunningham, J. N. (1985). Analysis of morbidity and mortality in patients 70 years of age and over undergoing isolated coronary artery bypass surgery. *American Heart Journal, 110*, 341-346.	*Purpose:* To assess factors that were predictive of perioperative morbidity and mortality. *Design:* Retro-spective case analysis; comparison of two dissimilar treatment groups. *Theoretical framework:* Standard medical model.	201 patients (72% males) over age 70; 1,242 patients under the age of 70 years.	*Preop:* DM, HTN, MI, CHF, smoking, renal failure, ↑ cholesterol, COPD, and family history of heart disease. Cath data: LV pressures, cardiac output, EF, LV wall motion, coronary artery stenosis ≥ 70%; LMCA stenosis ≥ 50%. *Opera-tive technique:* Mean # of bypasses, x-clamp time, pump time. *Complications:* periop MI, inotropic and IABP support, CVA, and renal failure requir-ing dialysis, mortality rate.	Not addressed.	Descriptive statistics including means and *SD*. Univariate statistical analysis using paired and unpaired Student's *t* tests, and chi-square analysis to compare frequencies.	Higher percentage of elders had CHF, DM, unstable symptoms, 3 vessel disease, LMCA stenosis, EF≤ 45%, and LVEDP ≥ 20 mm Hg. Mean cross-clamp and pump time did not differ between groups. More grafts were constructed in younger patients (2.9 ±1.0 vs 2.5 ±1.1, $p <$ .01). Patients >70 years had a higher incidence of postop MI, ↓ require-ments for inotropic and IABP support, CVA, and renal failure requiring dialysis. A larger percentage of older patients required prolonged ventilatory support. Mortality rates were higher in elders (5.9% vs 1.9%, $p < .01$). These data suggest that elderly patients have an increased risk for cardiac and noncardiac morbidity and mortality following CABS. The higher mortality rate may be a result of noncardiac organ failure.	Non-equivalent comparison group; indica-tions for surgery were different in those < 70. Older patients were sicker preoperatively. Retrospective evaluation of data collected for clinical purposes.

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Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*, 219-247.	*Purpose: The* purpose of this article is to present a scale to measure optimism, a study of construct validity, and a study examining predictive validity of the measure. *Design:* *Theoretical framework:* Behavioral self regulation.	Study 1: 16 items were administered to 81 undergraduate men and 69 undergraduate women. Study 2: Multiple groups of undergraduate students. The available time for testing was variable, so all students completed the LOT, but the numbers for other measures vary. Study 3: 79 undergraduate men and 62 undergraduate women enrolled in introductory psychology courses at Carnegie-Mellon University.	Study 1: Life Orientation Test (LOT): 8 items plus 4 filler items. Study 2: LOT + measures of locus of control, self-esteem, hopelessness, depression, perceived stress, social desirability, self-consciousness, alienation (context domains) and types of alienation.	Study 1: Cronbach's alpha = .76; test-retest reliability = .79. Study 2: psychometric characteristics of measures are not described. Study 3: psychometric characteristics of measures not described.	Study 1: principal factors factor analysis using an oblique rotational technique. Study 2: bivariate correlations with measures of other concepts. Items of the LOT were combined with items from the locus of control, self-esteem hopelessness and depression scales and subjected to principal factors analysis. The items of the LOT consistently loaded on one factor. Study 3: correlation and partial correlation used for hypothesis testing.	1: Instrument development used factors analysis and a combined $N > 1000$. Scale consists of 8 items, plus 4 filler items. Response options 5-point strongly agree to strongly disagree scale. Two highly correlated factors, 1 with positively and 1 with negatively worded items. Norms for male ($M = 21.02 \pm 4.56$) and female ($M = 21.41 \pm 5.22$) college students. 2: Optimists reported more internal locus of control and higher self-esteem and less hopelessness, depression, perceived stress, alienation, and social anxiety than did pessimists. 3: Optimism correlated with physical symptoms at T1 ($r = -.22$, $p < .01$) and T2 ($r = -.27$, $p < .001$). Partial correlation of optimism at T1 with symptoms at T2 after partialling out symptoms at T1 was also significant ($r = -.18$, $p < .05$).	Development and testing with college students. Optimism thought to be a stable personality trait. Tested over relatively short time.

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Scheier, M. F., Magovern, G. J., Abbott, R. A., Matthews, K. A., Owens, J. F., Lefebvre, R. C. & Carver, C. S. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: The beneficial effects on physical and psychological well-being. *Journal of Personality and Social Psychology, 57*, 1024-1040.	*Purpose:* to explore the impact of optimism on physical well-being and coping efforts in recovery after CABS. *Design:* Prospective, repeated measures design. *Theoretical framework:* Examined the effect of dispositional optimism on recovery. Differentiates dispositional optimism from specific efficacy expectations.	Convenience sample of first time CABS, male, average age = 48.5 years. *N* =51 out of 57. Relatively healthy sample.	*Life Orientation Test (LOT); Situation-specific expectancies; Surgical :* Intraop complications, pump and cross-clamp time, number of grafts. *Recovery at 6-8 days:* Self-assessment of physical and psychological condition; physician's assessment of physical recovery, morale, and prognosis for return to normal within 4 months; time needed to achieve physical markers of recovery. *Complications*	*LOT:* Cronbach's alpha .76; test retest reliability .79. Authors indicate that the Andrews and Withey Perceived QOL scale is psychometrically sound and provide a reference. The authors indicate that MAACL factor structure, internal consistency and predictive and construct validity are well documented. There is no mention of reliability/validity of other measures.	Descriptive statistics, correlations, multiple linear regression analysis, path analysis.	Optimists were less likely than pessimists to have perioperative MI. Optimists achieved each of the 5 in-hospital, physical markers of recovery earlier than the pessimists did. At 6 months, optimists were more likely than pessimists to have resumed vigorous physical activity, and to have returned to work on a full-time basis. Optimists reported higher QOL than pessimists at 6 months. Optimists had lower levels of presurgical hostility and depression. Optimists were more likely to seek information and to set goals for their recovery. They were less likely to ignore or suppress thoughts about their physical symptoms and were less likely to report being helped by attempts to ignore or not think about what their recovery would be like in the months ahead. Findings suggest that	Large number of relationships tested, some may have been significant by chance (Type I error). Truncated the LOT, MAACL and the QOL scale on the basis of the magnitude of the item-total correlations; pretesting procedures indicate acceptable correlations (.78 to .89) between the abbreviated and full instruments. The measures used were different at each measurement time.

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			at 6 weeks -- e.g., shortness of breath, lingering incisional pain, CHF. *Recovery at 6 months*: Degree of satisfaction with current health status, Rose angina questionnaire, rapidity with which various areas (e.g. return to work, vigorous physical exercise, socializing, recreational and hobbies) of life had returned to normal. 4. QOL: Andrews and Withey's Perceived QOL Scale. Coping strategies. Mood: Multiple Affect Adjective Check List.			pessimistic patients may be at risk for an extended and difficult recovery. Pessimists were more hostile, more depressed and expressed less satisfaction with the treatment they had been receiving. They asked fewer questions and were generally less involved in the recovery process. Those who need help the most, may thus be least likely to get help.	

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Sikorski, J. M. (1985). Knowledge, concerns, and questions of wives of convalescent coronary artery bypass surgery patients. *Journal of Cardiac Rehabilitation, 5*, 74-85.	*Purpose*: To determine the knowledge, the concerns, and the unanswered questions of wives of CABS patients in early convalescence. *Design*: Descriptive, exploratory design. Face to face interview. *Theoretical framework*: None specified. The author expressed a relationship between the husband's convalescence and interaction with his wife implying symbolic interaction.	Convenience sample of 30 wives of CABS patients. Patients had a preoperative diagnosis of stable angina and did not experience complications. Six wives attended a discharge class, all patients received a discharge booklet.	Tape-recorded standardized interview. Interviews were conducted during the 2nd or 3rd week after discharge. Questions included: coronary risk factors, medication, CAD, surgical outcome, physical discomforts and activities.	Interview schedule was evaluated for content validity by a cardiologist, cardiac surgery CNS, and 2 experts in research design and measurement. The instrument was pretested.	Content analysis using the same categories mentioned in the interview. Descriptive statistics and frequencies.	83% of the wives reported improvement judged by absence of angina. Early convalescence was anxious and stressful for the wives. Most women reported fatigue, a few anorexia, and a few sought treatment for anxiety. Husbands' pain and the wives' expectations were the factors that affected wives' adjustment during early convalescence. Most women reported better relationships with their husbands during the convalescent period; wives whose husband's had complications ($N = 9$) reported worse relationships. Wives were generally knowledgeable about coronary risk factors. The majority believed that CABS was a cure for CAD and that physical and emotional stress was the cause of their husbands illness. Wives' concerns related to allowable physical activity.	Small, convenience sample. Women used in pretesting were included in data analysis. Modified NYHA to include 2a and 2b without description of categories. Reported knowledge of risk factors and contradiction regarding CABS and stress were not discussed.

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Stanton, B. A., Jenkins, C. D., Denlinger, P., Savageau, J. A., Weintruab, R. M. & Goldstein, R. L. (1983). Predictors of employment status after cardiac surgery. *Journal of the American Medical Association, 249*, 907-911.	*Purpose:* To explore the determinants of return to work in men and women undergoing CABS or cardiac valve surgery. *Design:* Descriptive, correlational; longitudinal. *Theoretical framework:* None specified. Most of the work done by this group has used a Quality of Life framework.	Cohort of 228 patients from the Recovery Study; 84% male, 80% < 60 years of age.	*Preop:* frequency, severity and duration of cardiac symptoms, physical function, occupation, work characteristics, expectations to return to work, social participation, sleep patterns, smoking history, maximal physical exertion, education, and review of stressful life events. Three psychoneurological tests. *Postop:* emotional states, job and life satisfaction, optimism related to surgical	Where ever possible, standard psychological scales were used. Where existing scales were shortened, they were tested to ensure the adequacy of their psychometric properties.	The full cohort of 228 patients is used for comparisons of work status before and after surgery; analyses of predictors of return to work are limited to the 150 (66%) employed in the year before surgery. Analysis was conducted in stages with the variables grouped generally by the duration of time over which they could have been influencing the participant. Biographical variables were considered first, then medical history and current disease status, finally psychological variables.	Bivariate analysis: Significant correlates of work status at six months include occupation level, level of exertion required for blue-collar jobs, education and income level, preoperative functional class, anginal class, fatigue score on POMS, job satisfaction, well-being score, life satisfaction, helplessness score, and positive response to the question "Do you feel that you will be able to go back to work after your surgery?" In persons < 60 years, age was not a significant correlate of return to work. Multivariate analysis: Seven variables explained 33% of the variance in return to work ($F = 10.78$, $p = .01$): preoperative expectation, $\beta = .259$; POMS fatigue, $\beta = -.200$; class 3 or 4 angina, $\beta = -.172$; education, $\beta = .184$; Trail making A time, $\beta = -.162$; family income, $\beta = .175$;	Fairly young, healthy sample. Used same sample to generate and test the equation.

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			outcome, psychosocial support, annual family income, sexual function, and marital satisfaction. *Clinical data:* history of prior diseases and surgical procedures; physical exam findings; angiographic findings; preop medications; pump, anesthesia & total surgical time; complications; estimated blood loss; type of oxygenation; and condition at the time of transfer to ICU. *Outcome:* work status at six months postoperatively.		Contingency tables, *t* tests, or one-way ANOVA. Significant predictors from each temporal group were permitted to enter a stepwise MR procedure (forward selection with backward elimination). Finally, the "all possible subsets" MR method was used to provide added evidence regarding optimal	use of religion as a social support, $\beta = -.137$. The use of this equation on the same sample of patients yielded 86.7% correct classification of working status.	

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Stanton, B. A., Jenkins, C. D., Savageau, J. A. & Thurer, R. L. (1984). Functional benefits following coronary bypass graft surgery. *Annals of Thoracic Surgery, 37*, 286-290.	*Purpose*: Purpose of the overall study is to describe the course of recovery and extent of rehabilitation following major cardiac operation. Purpose of this report is to document the extent of improvement in physical, sexual and social-role functioning 6 months after CABS. *Design*: Descriptive, longitudinal. *Theoretical framework*: Quality of Life.	Cohort of 340 patients (age 32-69 years; M = 54.2); 293 (86%) males undergoing CABS and participating in the Recovery Study.	Measures not described in this report. See preceding study.		Correlation coefficients, chi-square analyses, *t* tests, and one-way ANOVA. To reduce the frequency of chance associations arising from the large number of variables analyzed, the criterion level of statistical significance was lowered from .05 to .01 where necessary.	*Physical*: Daily physical activity ↑ and disabled days due to cardiac problems ↓ significantly over the 6-month period. Fatigue and vigor scores were related to both measures of physical functioning. After controlling for the effects of vigor and fatigue, trouble sleeping, exertional angina, and daily doses of propranolol remained significantly related to physical disability at 6 months. Level of daily activity and amount of physical disability were strongly related to gender. Men were more active and less disabled than women. Persons with higher education fared better physically. Neither age nor preoperative duration of cardiac symptoms was significantly associated with physical function. A ↓ in number of sedentary patients was observed. *Return to work and social*	The population is well described and homogeneous. However, it probably represents a "healthier" than normal population undergoing CABS.

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						activities: Daily activity and physical disability were significantly associated with return to work among patients employed preoperatively. Educational level and family income level were stronger predictors of return to work than occupation or level of physical exertion required. Age was not a significant predictor of return to work in patients < 60 years of age. Severity of illness did not predict return to work. Social activities correlated with improvement in daily activity and physical disability. *Satisfaction with sexual activity*: 21% improved, 55% no change, and 24% decreased. Factor analysis revealed that recovery of these functions involves at least 3 factors: resumption of role responsibilities; being home bound by disability; and stamina.	

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Steingart, R. M., Packer, M., Hamm, P., Coglianeses, M. E., Gersh, B., Geltman, E. M., Sollano, J., Katz, S., Moye, L., Basta, L. L., Lewis, S. J., Gottlieb, S. S., Bernstein, V., McEwan, P., Jacobson, K., Brown, E. J., Kukin, M. L., Kantrowitz, M. E., & Pfeffer, M. A. (1991). Sex differences in the management of coronary artery disease. *New England Journal of Medicine 325*, 226-230.	*Purpose:* To compare the care received by men and women prior to their MI. *Design:* Retrospective case series analysis.	Sample consisted of 1,842 men and 389 women who were enrolled in the Survival and Ventricular Enlargement trial. All patients had had an MI in the 3 to 16 days prior to enrollment. All patients had an LVEF ≤ 40%.	Clinical data including coronary risk factors, number of previous hospitalizations for MI, cardiac cath, PTCA, or CABS, presence and severity of angina, and functional status within 3 weeks prior to the index infarct.	Procedures for data collection and entry were fully described in an operations manual. Data collectors were carefully trained.	Chi-sqare statistic for discrete variables and the *z* score for continuous variables. Multiple logistic regression to determine the likelihood of patient undergoing cardiac cath or CABS as a function of sex while controlling other clinically cogent variables.	Pre-MI coronary risk factors were more prevalent and more severe in women than men. Women were older and more likely to have a family history of heart disease and a history of DM or HTN. 86% of the women were post menopausal. Although the presence and frequency of angina was similar for men and women, women were more likely to report disability from ischemic symptoms. Despite reporting greater disability, women were less likely to be referred for cardiac catheterization and CABS before MI. The presentation of the index infarction was similar for men and women, and both sexes had a a similar hospital course and were equally likely to undergo cardiac cath and CABS after their MI.	Sample criteria for the Survival and Ventricular Enlargement trial were not described. The criteria for diagnosis of MI were not presented. Comparability of men and women on variables other than gender were not described.

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Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Sutherland, H. J., Lockwood, G. A., & Cunningham, A. J. (1989). A simple, rapid method for assessing psychological distress in cancer patients: Evidence of validity for linear analog scales. *Journal of Psychosocial Oncology, 7*, 31-43.	*Purpose:* To provide evidence of validity of POMS linear analog scale and to demonstrate the sensitivity to change following psychotherapeutic intervention. *Design:* The 3 questionnaires were interspersed with several other instruments in a booklet. The patients completed the booklet at an "orientation" night, one week before classes started and again at the last class session.	42 patients with cancer at various sites and stages who volunteered for a cognitive, self-help coping course. Volunteers were predominantly women, almost all Caucasian, and tended to be younger and better educated than the average cancer patient.	POMS: 65 adjective self-rating scale designed to identify and assess transient, fluctuation in affective states. SCL-90-R: 90 item self-report symptom inventory designed to reflect patterns of psychological symptoms. POMS-LASA: Newly developed version of the POMS containing 6 linear analog scales.	POMS: reliability, validity, sensitivity, and norms have been established. SCL-90-R: Reliability, validity, and normative data have been well established for cancer patients as well as for "normals".	Spearman's rank correlation coefficients were used to examine association between the scores obtained on the established instruments and the association between the scores on the established versus the new questionnaire. Differences were examined using Wilcoxon signed rank tests. MR analyses were performed using POMS subscales and POMS-LASA scores as predictors.	High correlation between the scales on the two instruments measuring anxiety and depression. Spearman's $r = .77$. There was significant correlation between virtually all measures on the POMS and all measures on the SCL-90-R. 79% of the total variation in SCL-90-R score was explained by variation in the 6 POMS factors. The coefficients were lower when the POMS-LASA scores were used, but regression analysis showed that 71% of the variation in SCL-90-R was explained by the POMS-LASA. Correlations between POMS-LASA and POMS subscales ranged from .61 to .76, with a correlation = .83 for the total mood disturbance scores. The POMS, the SCL-90-R, and the POMS-LASA all demonstrated sensitivity to change.	Small convenience sample.

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Taylor, C. B., Bandura, A., Ewart, C. K., Miller, N. H., & DeBusk, R. F. (1985). Exercise testing to enhance wives' confidence in their husbands' cardiac capability soon after clinically uncomplicated acute myocardial infarction. *American Journal of Cardiology, 55,* 635-638.	*Purpose:* To test exercise testing as an intervention to ↑ patients' and spouses' confidence in patients' capabilities. *Design:* Experimental. 3 groups, group I wife waited; group II wife observed ETT; group III wife walked on the treadmill for 3 minutes at the same peak treadmill workload her husband had achieved. Measures repeated at 3 weeks, 11 weeks, and 26 weeks post MI. *Theoretical framework:* Self efficacy theory.	30 consecutive married men, mean age 52 ± 9 years 3 weeks after clinically uncomplicated MI and their wives. Ten assigned to each group.	*Perceived efficacy:* 12 common activities that impose a stress on the heart. Confidence rated on a 100-point scale. Both husband and wife completed the scales before testing, immediately after testing, and after a post testing counseling session with physician and nurse. *ETT:* Naughton protocol; exercise commenced at 3 mets and workloads were added every 3 minutes until the appearance of limiting symptoms.	Principal-components analysis was conducted on both the husbands' and wives' efficacy scores to avoid redundant overlap of correlated measures. Two main factors extracted: perceived physical efficacy (activity) and cardiac efficacy (perceived cardiac capacity). Reliability of the self efficacy scales for physical and cardiac self-efficacy was $r = .94$ and $r = .85$ respectively.	Pearson correlations of treadmill results with perceived efficacy ratings. ANOVA to examine change in self efficacy. *t*-tests to compare changes in self-efficacy from baseline to post ETT to post counseling.	Patient groups did not differ on the peak treadmill workloads achieved at any time period. Self-efficacy scores for patients and spouses before treadmill testing did not differ significantly between groups. Patients demonstrated ↑ in the perception of cardiac capability after ETT and counseling ($F = 7.5$, $p < .001$). Before testing wives' ratings were substantially lower than those of their husbands. Among wives who did not participate in treadmill walking, no significant ↑ in the perception of their husbands' capabilities occurred. Wives who did walk the treadmill registered a sharp ↑ in the perception of their husbands' cardiac and physical efficacy ($F = 6.99$, $p < .004$ and $F = 5.49$, $p < .01$). Overall congruence between husbands' and wives' self-efficacy scores were	Methods of data analysis are not described. My assumption is that repeated measures ANOVA and paired *t*-tests were used, although that is not stated in the article. It appears as if *t*-tests were used to test interior differences within significant ANOVAs; these were significant at levels of .0005 and .001.

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						greater in wives who walked the treadmill than those who did not (F = 3.91, $p < .05$, and F = 3.08, $p < .02$). The measures of perceived efficacy obtained after ETT and counseling at 3 weeks were correlated with ETT at 11 and 26 weeks. The combined perception of patients and their wives concerning the patients' cardiac capabilities proved to be the most consistent predictor of patients' cardiovascular functioning at 11 and 26 weeks.	

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Williams, R. B., Barefoot, J. C., Califf, R. M., Haney, T. L., Saunders, W. B., Pryor, D. B., Hlatky, M. A. Siegler, I. C., & Mark, D. B. (1992). Prognostic importance of social and economic resources among medically treated patients with angiographically documented coronary artery disease. *JAMA, 267*, 520-524.	*Purpose*: To evaluate the hypothesis that diminished social and economic resources impact adversely on cardiovascular mortality in patients with coronary artery disease. *Design*: Cohort study of patients undergoing cardiac catheterization from 1974 to 1980 and followed up through 1989.	1368 patients with ≥ 75% stenosis of a major coronary artery; 82% male, 99% white, with a median age of 52 years. Study group was primarily middle class with adequate income and reported satisfactory social relationships.	Clinical data. Outcome measure = survival time until cardiovascular death.	Not addressed.	Descriptive statistics. Life tables using the methods of Kaplan and Meier. Cox proportional hazards regression analyses. Analysis was done in two phases to minimized missing data. First separate economic and social models were derived. Then statistically significant effects found in the separate models were entered into one model. Likelihood ratio chi-square of the final Cox model.	Patients with higher household incomes had better survival (adjusted $\chi^2 = 10.9$, $p = .001$). Those with income < $10,000 were almost twice as likely to die within 5 years as those with higher incomes (hazard ratio = 1.9). Married patients had better survival than did unmarried patients (adjusted $\chi^2 = 4.6$, $p = .032$). There was a significant interaction between marital status and confidant availability (adjusted $\chi^2 = 10.5$, $p = .001$), such that the unmarried patients without a confidant had the lowest survival rate. The most important prognostic socioeconomic variable was the presence or absence of a spouse or confidant ($\chi 2 = 18$, $p < .0001$). The 3 socioeconomic variables explained 12% of the variance in prognosis.	Sample was white, middle class, predominantly males. Results reflect the experience of a tertiary-care medical center in the southeastern United States.

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Winefield, H. R. & Cormack, S. M. (1986). Regular activities as indicators of subjective health status. *International Journal of Rehabilitation Research, 9*,47-52.	*Purpose:* To explore the utility of activity measures as health indicators. *Design:* Descriptive exploratory.	Two samples, one consisted of 70 MI survivors (36.6% women) 4 months after an MI, and 48 men attending a cardiac fitness class who had survived MI up to 10 years (mean survival time = 3.6 years). Mean ages were 59.3 and 54.4 years respectively. All were community dwelling.	26 items from Katz activity scale: home, outside and social. Anxiety and depression were measured by 3 VAS each. Subjects also rated their current health as a percentage of that before MI.	The 4 nonactivity health indicators were all significantly correlated with each other in the expected directions ($p < .01$).	Frequency scores for sex, work, and exercise. Correlations.	For subjects whose MI had occurred 4 months before, frequency of optional excursions was inversely related to number of symptoms ($r = -.31$, $p = .01$), diversity of outside activities was related to depression ($r = -.32$, $p < .01$), anxiety ($r = -.28$, $p < .01$), and symptoms ($r = -.31$, $p < .01$). Subjects who had recently survived an MI seemed to associate their health status with level of engagement in outgoing and sociable activities.	Possible response bias in self-report data. Convenience sampling not well described.

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Winslow, C. M., Kosecoff, J. B., Chassin, M., Kanouse, D. E. & Brook, R. H. (1988). The appropriateness of performing coronary artery bypass surgery. *JAMA, 260,* 505-509.	*Purpose:* To examine clinical data and determine the actual reasons for performing CABS in a defined community. *Design:* Retrospective case series analysis.	Stratified random sample of patients who had undergone CABS in 3 hospitals in the years 1979, 1980, and 1982 in a western state. The total number of patients who had undergone CABS was 4949; the records of 401 were randomly selected for abstraction. The final sample used for analysis was 386.	Clinical data from medical record review. Demographics, comobidity, process of care using noninvasive tests, and indications for CABS. A mutually exclusive set of indications for CABS was created. Appropriateness meant that the expected health benefit exceeded expected negative consequences by sufficiently wide margin so the procedure was worth doing. Appropriateness was the median rating of 9 panelists.	Medical record abstraction was performed by experienced, trained personnel. Photocopies of all reports of noninvasive exercise test and angiograms were interpreted by a physician. Techniques used had been previously tested in the RAND UCLA health utilization study. 13 medical records were randomly reabstracted by a different abstractor. Inter rater reliability was .73.	Descriptives, ANOVA.	Median age of patients was 60 years, 28% were older than 65. Males constituted 81% of the group. 56% of the cases involved CABS performed for appropriate reasons, 30% for equivocal reasons, and 14% for inappropriate reasons. When compared by age groups, CABS was used slightly more appropriately in the elderly than in younger subjects ($p < .05$).	The panel of physicians who determined the appropriateness of CABS for indication consisted of 1 family practice, 2 internists, 3 cardiologists, 2 cardiac surgeons and a radiologist. These criteria were determined in 1984 and have changed in view of acute thrombolytic and PTCA therapy.

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Yates, B. C. (1987). Gender differences in compliance behaviors and health perceptions of coronary bypass surgery patients. *Progress in Cardiovascular Nursing, 2,* 105-112.	*Purpose:* To examine gender differences in CABS patients' levels of compliance. *Design:* Cross-sectional, exploratory, survey. *Theoretical framework:* Theoretical rationale based on gender role expectations. Traditional role expectations prohibited women from smoking and engaging in active exercise; predicted women would be more likely to quit smoking and less likely to exercise after CABS.	Convenience sample of 44 (19%) women and 192 (81%) men who were 5-20 months post CABS (*M*= 12.5, *SD* = 4.3). Men and women were similar in age (60 years) and education (12 years).	*Questionnaire:* sociodemographic parameters, length of preoperative illness, presence of cardiac symptoms since surgery, and self-reported health status. Compliance behaviors selected for measurement were exercise levels, smoking cessation, dietary habits, and obesity/ weight loss. The response categories were structured similarly to Dracup's Risk Factor Index.	New instrument. Cronbach's alpha in this study for the total compliance scale was 0.6. Content validity of the questionnaire was determined by four cardiac rehabilitation experts. The questionnaire was field tested for clarity and completion time.	Chi-square statistic was used to test for gender differences on dichotomous data. Student's *t*-test was used for interval level, parametric data, and the Mann-Whitney *U* test for nonparametric data. Correlations (PPM or Kendall's Tau).	More women (32%) than men (6%) were single; more men (62%) than women (23%) were employed. Length of illness was similar for both men and women (2 years), more women reported experiencing angina (45%) and dyspnea (36%) after surgery. Men reported better health (M =2.9, *SD* = .7) than women (*M*= 2.5, *SD* = .7). No difference in proportion of men and women who were exercising or in the frequency of exercise; men exercised longer. Longer duration of exercise was associated with short preoperative illness and higher health perception in both genders. In women, better perceived health was associated with greater frequency of exercise. More women than men had never smoked; 10% of the sample continued to smoke; no gender	Low internal consistency coefficient for the overall compliance scale (.6) may reflect differing levels of compliance among the behaviors. This explanation is supported by the data and would weaken importance of the associations with total compliance scores. It is not clear to what extent the author considered the link between gender and more severe disease at the time of surgery.

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						differences in number of cigarettes smoked/day; more women than men quit smoking after surgery. More women (66%) than men (47%) were overweight. Amount of weight loss/ month was inversely associated with age for both genders. There were no gender differences in dietary adherence. Dietary adherence in women was positively associated with age, and inversely associated with work status. For men, dietary adherence was inversely related to the length of preoperative illness. Men reported significantly higher total adjusted compliance than women. A general trend for both genders was higher compliance in individuals with better perceived health and shorter preop illnesses. Women reported significantly lower health and more symptoms than men.	

Summary of Research Cited in Literature Review

Author	Purpose Design	Sample Setting	Measures	Psychometrics	Data Analysis	Results	Limitations
Zyzanski, S. J., Stanton, B. A., Jenkins, C. D., & Klein, M. D. (1981). Medical and psychosocial outcomes in survivors of major heart surgery. *Journal of Psychosomatic Research, 23*, 213-221.	*Purpose:* To identify major social and psychological barriers to recovery after cardiac surgery; To compare CABS and valve patients on psychosocial and bio-medical outcomes; To identify variables that might be influencing factors of recovery; and, To determine whether the frequency of psychosocial problems is dependent on the severity of biomedical problems or other identifiable 'risk factors'. *Design:* Cross-sectional survey; response rate >80%.	25% random sample was drawn from the membership rolls of Mended Hearts, Inc. Sample consisted of 949 adults (75% males, 76% post-CABS). Age 50 to 69 years.	*Medical:* repeat surgery, heart-related hospitalization, recurrent severe chest pain or dyspnea, ≥ 3 days in bed in past month. *Psychological Affect After Heart Surgery (PAAHS):* depression, anxiety, pleasure in life and optimism. *Social Adjustment After Heart Surgery (SAAHS):* relationships between patient and spouse, children, relatives and co-workers. *Current Emotional state*, and *Current Social Network*.	*PAAHS:* Average item-scale correlation, .79. *SAAHS:* average item-scale correlation, .67. *Current emotional state:* average item-scale correlation, .60. *Current social network:* average item-scale correlation, .50.	Descriptive and correlational statistics.	Mean time between surgery and the survey = 3.5 yrs. Among bypass patients, a higher percentage of women than men reported severe, recurring chest pain or dyspnea. Consistent ↓ psychosocial functioning was observed in patients experiencing heart related hospitalization, other major health problems, continuing and intense chest pain and illness-related bed rest. Patients undergoing multiple procedures or repeat surgeries did not report more serious psychosocial problems. Age was unrelated to the behavioral outcomes. Physical medical problems, sex, type of surgery, level of education, forced retirement and Type A behavior pattern were associated with poor psychosocial recovery.	Sample may not be representative of the population of patients undergoing heart surgery. It is the impression of the leaders of Mended Hearts, Inc. and the authors that persons with poor initial course of recovery, particularly those with continuing severe disability are less likely to join the organization. Potential problems with recall, asking subjects approximately 3.5 years post operative to recall preoperative psychological and emotional status.

Appendix B

Consent Forms and Fact Sheet

UNIVERSITY OF WASHINGTON

DEPARTMENT OF PHYSIOLOGICAL NURSING AND DIVISION OF CARDIOTHORACIC SURGERY

OREGON HEALTH SCIENCES UNIVERSITY

SCHOOL OF NURSING, OFFICE OF GRADUATE STUDIES

TITLE OF STUDY: Convalescence after cardiac surgery: A dyadic experience

INVESTIGATOR: Barbara Sather Levine, PhC, RN, 206-527-4814
Doctoral Candidate, Oregon Health Sciences University
Clinical Instructor, Department of Physiological Nursing,
University of Washington

FACULTY: Patricia G. Archbold, DNSc, RN, 503-494-3840
Professor, Oregon Health Sciences University, Portland, OR.

Edward D. Verrier, MD, 206-685-3370
Associate Professor and Chief
Division of Cardiothoracic Surgery, University of Washington

PURPOSE: You and your partner are being asked to participate in a nursing research study. The purpose of this study is to examine the interaction of patient and partner characteristics as they affect recovery from cardiac surgery. Information from this study may be used by nurses in the future to prepare patients and families for their experiences after leaving the hospital.

PROCEDURES: Information will be gathered from each of you individually. The questions are similar for each of you and ask about the patient's activity level before surgery, each of your general health, your general attitude toward life, your relationship, your expectations for activity during convalescence, and your experiences during convalescence. The most personal or sensitive questions ask about your relationship, your memory and thinking, and if you feel able to engage in sexual activity. This information will be gathered through an interview and through written surveys. There is a total of seven standard questionnaires and 17 individual questions distributed among the surveys and interviews.

Partner: A screening interview will be done today with the partner. This is a standard interview about memory and thinking. In addition, the partner will be given a written survey and asked to return it before the patient is discharged from the hospital. The interview will take 5 to 10 minutes and the survey will take 20 to 30 minutes. The survey can be completed at home.

Patient: Three to six days after surgery the patient will be interviewed. This interview may take about an hour but can be completed in two sessions if you are too tired. The investigator will review your medical record to gather additional information about your surgery, your hospital course, associated illnesses, and your medications.

Patient & Partner: Three months after surgery, a survey will be mailed to each of you at home. These surveys will ask about your individual experiences during convalescence and will take 30 to 45 minutes to complete. You will each be asked to complete your survey individually and to return it in an enclosed, stamped envelope. One week after receiving the survey you will each receive a postcard thanking you or reminding you to return the survey. If you do not return the survey, a second complete survey will be mailed to you three weeks later. No further contact will be initiated by the investigator after that time.

RISKS AND DISCOMFORTS: It is possible that some of the questions may upset you or that you may find the interview tiring. There is some inconvenience associated with the time and effort required to complete the survey.

BENEFITS: This study is not designed to benefit either of you personally. By being participants, you may contribute new information that may benefit patients and families in the future. Some people have found it personally satisfying to share their experiences with an interested professional.

CONFIDENTIALITY: Your names will not be included on the survey or interview forms. They will have ID numbers that allow matching your responses with your partner's responses. Your responses will not be revealed to your partner by the investigator. Only the investigator and her committee members will have access to identifiable data. The completed interview, survey, and chart review forms will be kept indefinitely by the investigator. Neither your name nor identity will be used for publication or publicity purposes.

COSTS: No research costs will be charged to you.

YOUR RIGHTS AS PARTICIPANTS: Your participation in this study is voluntary. You may decline to answer any question, or may withdraw from the study at anytime without affecting your treatment at or relationship with the University of Washington or the Oregon Health Sciences University (OHSU). A copy of this consent form is provided for your records and a copy will be kept by the investigator. The final dissertation will be available in theOHSU library Portland, Oregon.

YOUR RIGHTS (*continued*):

Because the investigator is a doctoral student at OHSU the following statement applies: the OHSU, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird in Portland at 503-494-8014. If you have any questions about the study or about your rights as a research subject the investigator will answer them.

(Signature of investigator) (Date)

PARTICIPANTS' STATEMENT: The study described above has been explained to me. I voluntarily consent to participate in this activity. I have had an opportunity to ask questions. I understand that future questions I may have will be answered by Barbara Levine whose phone number is listed above.

(Signature of patient) (Date)

(Signature of partner) (Date)

cc: Patient
Partner
Investigator

PROVIDENCE MEDICAL CENTER

OREGON HEALTH SCIENCES UNIVERSITY

Consent Form

TITLE OF STUDY: Convalescence after cardiac surgery: A dyadic experience

INVESTIGATOR: Barbara Sather Levine, PhC, RN, 206-527-4814
Doctoral Candidate, Oregon Health Sciences University

FACULTY: Patricia G. Archbold, DNSc, RN, 503-494-3840
Professor, Oregon Health Sciences University, Portland, OR.

PMC SPONSORS: David M. Gartman, MD, 328-2001
Cardiovascular and Pediatric Surgery, Inc., P.S.

Debra Laurent-Bopp, MN, RN, 320-3792
Cardiovascular Clinical Nurse Specialist, Providence Medical Center

PURPOSE: You and your partner are being asked to participate in a nursing research study. The purpose of this study is to examine the interaction of patient and partner characteristics as they affect recovery from cardiac surgery. Information from this study may be used by nurses in the future to prepare patients and families for their experiences after leaving the hospital.

PROCEDURES: Information will be gathered from each of you individually. The questions are similar for each of you and ask about the patient's activity level before surgery, each of your general health, your general attitude toward life, your relationship, your expectations for activity during convalescence, and your experiences during convalescence. The most personal or sensitive questions ask about your relationship, your memory and thinking, and if you feel able to engage in sexual activity. This information will be gathered through an interview and through written surveys. There is a total of seven standard questionnaires and 17 individual questions distributed among the surveys and interviews.

Partner: A screening interview will be done today with the partner. This is a standard interview about memory and thinking. In addition, the partner will be given a written survey and asked to return it before the patient is discharged from the hospital. The interview will take 5 to 10 minutes and the survey will take 20 to 30 minutes. The survey can be completed at home.

Patient: Three to six days after surgery the patient will be interviewed. This interview may take about an hour but can be completed in two sessions if you are too tired. The investigator will review your medical record to gather additional information about your surgery, your hospital course, associated illnesses, and your medications.

Patient & Partner: Three months after surgery, a survey will be mailed to each of you at home. These surveys will ask about your individual experiences during convalescence and will take 30 to 45 minutes to complete. You will each be asked to complete your survey individually and to return it in an enclosed, stamped envelope. One week after receiving the survey you will each receive a postcard thanking you or reminding you to return the survey. If you do not return the survey, a second complete survey will be mailed to you three weeks later. No further contact will be initiated by the investigator after that time.

RISKS AND DISCOMFORTS: It is possible that some of the questions may upset you or that you may find the interview tiring. There is some inconvenience associated with the time and effort required to complete the survey.

BENEFITS: This study is not designed to benefit either of you personally. By being participants, you may contribute new information that may benefit patients and families in the future. Some people have found it personally satisfying to share their experiences with an interested professional.

CONFIDENTIALITY: Your names will not be included on the survey or interview forms. They will have ID numbers that allow matching your responses with your partner's responses. Your responses will not be revealed to your partner by the investigator. Only the investigator and her committee members will have access to identifiable data. The completed interview, survey, and chart review forms will be kept indefinitely by the investigator. Neither your name nor identity will be used for publication or publicity purposes.

COSTS: No research costs will be charged to you.

YOUR RIGHTS AS PARTICIPANTS: Your participation in this study is voluntary. You may decline to answer any question, or may withdraw from the study at anytime without affecting your treatment at or relationship with the Providence Medical Center or the Oregon Health Sciences University (OHSU). A copy of this consent form is provided for your records and a copy will be kept by the investigator. You may request a summary of the findings be provided to you by the investigator upon completion of the study. The final dissertation will be available in theOHSU library Portland, Oregon.

YOUR RIGHTS (*continued*):

Because the investigator is a doctoral student at OHSU the following statement applies: the OHSU, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird in Portland at 503-494-8014. If you have any questions about the study or about your rights as a research subject the investigator will answer them.

(Signature of investigator) (Date)

PARTICIPANTS' STATEMENT: The study described above has been explained to me. I voluntarily consent to participate in this activity. I have had an opportunity to ask questions. I understand that future questions I may have will be answered by Barbara Levine whose phone number is listed above.

(Signature of patient) (Date)

(Signature of partner) (Date)

cc: Patient/Partner
Investigator

VIRGINIA MASON MEDICAL CENTER

OREGON HEALTH SCIENCES UNIVERSITY

TITLE OF STUDY: Convalescence after cardiac surgery: A dyadic experience

INVESTIGATOR: Barbara Sather Levine, PhC, RN, 206-527-4814
Doctoral Candidate, Oregon Health Sciences University

FACULTY SPONSOR: Patricia G. Archbold, DNSc, RN, 503-494-3840
Professor, Oregon Health Sciences University, Portland, Oregon

VMMC SPONSOR: Sandra L. Tidwell, MN, RN, 206-223-6776
Clinical Nurse Specialist, Virginia Mason Clinic Cardiothoracic Surgery

INVESTIGATOR'S STATEMENT

PURPOSE: You and your partner are being asked to participate in a nursing research study. The purpose of this study is to examine the interaction of patient and partner characteristics as they affect recovery from cardiac surgery. Information from this study may be used by nurses in the future to prepare patients and families for their experiences after leaving the hospital.

PROCEDURES: Information will be gathered from each of you individually. The questions are similar for each of you and ask about the patient's activity level before surgery, each of your general health, your general attitude toward life, your relationship, your expectations for activity during convalescence, and your experiences during convalescence. The most personal or sensitive questions ask about your relationship, your memory and thinking, and if you feel able to engage in sexual activity. This information will be gathered through an interview and through written questionnaires.

Partner: A screening interview will be done today with the partner. This is a routine screening interview about memory and thinking. In addition, the partner will be given a written questionnaire and asked to return it before the patient is discharged from the hospital. The interview will take 5 to 10 minutes and the questionnaire will take 15 to 30 minutes. The questionnaire can be completed at home.

Patient: Three to six days after surgery the patient will be interviewed by the investigator. This interview may take about an hour but can be completed in two sessions if you are too tired. The investigator will review your medical record to gather additional information about your surgery.

Patient & Partner: Three months after surgery, a questionnaire will be mailed to each of you at home. These questionnaires will ask about your individual experiences during convalescence and will take 30 to 45 minutes to complete. You will each be asked to complete your questionnaire individually and to return it in an enclosed, stamped envelope. One week after receiving the questionnaire you will each receive a postcard thanking you or reminding you to return the questionnaire. If you do not return the questionnaire, a second complete packet will be mailed to you three weeks later. No further contact will be initiated by the investigator after that time.

BENEFITS: This study is not designed to benefit either of you personally. By being participants, you may contribute new information that may benefit patients and families in the future. Some people have found it personally satisfying to share their experiences with an interested professional.

RISKS AND DISCOMFORTS: It is possible that some of the questions may upset you or that you may find the interview tiring. There is some inconvenience associated with the time and effort required to complete the questionnaire.

COSTS: There are no financial costs to you associated with this study. You and your insurance company are financially responsible for standard treatment costs incurred while participating in this study.

CONFIDENTIALITY: Your names will not be included on the questionnaire or interview forms. They will have ID numbers that allow matching your responses with your partner's responses. Your responses will not be revealed to your partner by the investigator. Information regarding your participation in this study will be available only to the investigator, her committee members, and your health care providers. All precautions to maintain confidentiality of medical records will be taken. Only the investigator and her committee members will have access to identifiable data. You will not be identified by name, picture or any other identifying information in any publication resulting from this study.

YOUR RIGHTS AS PARTICIPANTS: Your decision to participate in this study is voluntary and you may withdraw your consent at any time, for any reason, without prejudice. You will be informed of any new information which may affect your willingness to continue in this study. If you withdraw your consent to participate in this study, additional medical care by your physician will be continued. Your doctor may also terminate your participation in this study without your consent if he feels it is in your best interest.

Before you sign this consent form, please ask questions on any aspect of this study which is not clear to you. If you have any questions about the study or about your rights as a research subject the investigator will answer them. You will be given a copy of this consent form to take home with you, and a copy will be placed in your medical record. The final report of the research will be available in the OHSU library Portland, Oregon.

Because the investigator is a doctoral student at OHSU the following statement applies: the OHSU, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird in Portland at (503) 494-8014.

PARTICIPANTS' STATEMENT

I acknowledge I have fully reviewed and understand the contents of the foregoing investigator's statement. The proposed research program has been satisfactorily explained to me and I have had the opportunity to have all my questions answered about this program. I understand side effects, complications or injury may occur as a result of this research. I have not been promised compensation for any such adverse effects which might occur, but have been assured appropriate medical care will be available for any such effects. However, I have not waived any of my legal rights by signing this form. I have not been promised costs for such care will be waived. I give my permission to have the investigator review my medical records in connection with this study. The medical record of the partner will not be reviewed. My signature below indicates I voluntarily agree to participate in this study and I hereby give my consent.

PATIENT SIGNATURE DATE

PARTNER SIGNATURE DATE

WITNESS SIGNATURE DATE

INVESTIGATOR SIGNATURE DATE

CONVALESCENCE AFTER CARDIAC SURGERY

Dissertation Research sponsored by the Oregon Health Sciences University

DATE:
TO: Health care providers VMMC cardiac step down unit
FROM: Barbara Sather Levine, PhC, RN
RE: Research Protocol -- Fact Sheet

Your patient ______________________ and his or her partner have agreed to participate in a nursing research study about convalescence after cardiac surgery. The purpose of this study is to examine the interaction of individual and dyadic characteristics as they influence physical activity and emotional state during convalescence. The investigator will schedule an interview with the patient between the third and sixth post-operative day. This interview will take place on the cardiac step down unit and may require an hour to complete. Questions from several standard measures will be asked including the following: the Short Portable Mental Status Questionnaire, the Duke Activity Scale, the Life Orientation Test, the Mutuality Scale, and a visual analog form of the Profile of Mood States (POMS). The patient will also be asked about his or her activity self-efficacy. The medical record will be reviewed for demographic and illness severity data. The partner has also consented to participate. He or she has completed the Short Portable Mental Status Questionnaire and has been given a written questionnaire containing the other measures listed above. The partner has been asked to complete the written questionnaire before the patient is discharged and to return it in a stamped addressed envelope which was provided.

The interview may be tiring for the patient. The interview will be conducted by the investigator, an experienced cardiovascular clinician. If the patient shows signs of undue fatigue, the interview will be curtailed and completed at a later time. If the patient becomes upset, the investigator will remain with the patient until he or she is comfortable and will report the upset to the patient's primary nurse.

Three months after discharge, the patient and partner will receive a written questionnaire through the mail. This questionnaire includes the Duke Activity Scale, the Life Orientation Test, the visual analog and standard form of the POMS, and a measure of role strain and satisfaction during convalescence. This questionnaire will be returned by mail to the investigator. The final report of this study will be available in the OHSU library in Portland, OR in the summer of 1993.

A copy of the consent form has been placed in the medical record. Sandra L. Tidwell MN, RN has a copy of the complete protocol. She can be reached in the clinic at 223-6776. If you or your patient have any additional questions about this study please call me at home 527-4814. That phone is often answered by a machine, if you leave your name and number and a brief message I will return your call.

Barbara S. Levine, Ph.C., R.N.-C. • 4509 NE 71st Street • Seattle, Washington 98115 • 206-527-4814

Appendix C

Data Collection Instruments

Convalescence from Cardiac Surgery:
the Patient's Perspective

(Predischarge Interview)

ID NUMBER: ________

NARRATIVE FOR BEGINNING INTERVIEW

Hello. You may remember me, my name is Barbara Levine, I am the nurse conducting a research study about couples experience during convalescence after cardiac surgery.

I want you to be as comfortable as possible during the interview. If we need to stop and take a break or if you wish to postpone the interview, please let me know. Remember that you may refuse to answer any of the questions or may discontinue or postpone the interview at any time without affecting your care here at the University.

Do you have any questions before we begin?

I. The first questions are routine screening questions. Sometimes after surgery people find that their thinking and memory is a little cloudy. This may be related to the medications or the stress of hospitalization. When it happens it is almost always temporary. It is important to know if you are having this experience. As I said these are routine questions, please do not be offended by them.

1. What is the date today? (month/day/year)
2. What day of the week is it?
3. What is the name of this place?
4. What is your telephone number? (If no telephone, ask for street address.)
5. How old are you?
6. When were you born? (month/day/year)
7. Who is the current president of the United States?
8. Who was the president just before him
9. What was your mother's maiden name?
10. Subtract 3 from 20 and keep subtracting each new number you get, all the way down. (Record actual numbers.)

Thank you for completing those questions. They may seem silly, but they do provide important information. The rest of the questions do not have any right or wrong answers, I just want your honest opinions, views, or feelings.

SPMSQ SCORE:
0-2 errors = intact 1
3-4 errors = mild intellectual impairment 2
5-7 errors = moderate intellectual impairment 3
8-10 errors = severe intellectual impairment 4

Allow one more error for only grade school education; one less error for education beyond high school; one more error for blacks regardless of education criteria.

PRESURGICAL HEALTH AND ACTIVITIES

II. The next questions have to do with your health and activity before surgery.
1. How long have you been aware of your heart disease? (months or years)

2. When did your doctor first tell you about your heart disease?

3. What is your occupation? If retired, what was your occupation prior to retirement?

III. I am going to ask you about a series of activities. I would like you to think about <u>the month before surgery</u>. In the month before surgery, could you:

1.	Take care of yourself, that is, eating, dressing, or using the toilet?	N	Y
2.	Walk indoors, such as around your house?	N	Y
3.	Walk a block or two on level ground?	N	Y
4.	Climb a flight of stairs or walk up a hill?	N	Y
5.	Run a short distance?	N	Y
6.	Do light work around the house like dusting or washing dishes?	N	Y
7.	Do moderate work around the house like vacuuming, sweeping floors, or carrying in groceries?	N	Y
8.	Do heavy work around the house like scrubbing floors,lifting or moving heavy furniture?	N	Y
9.	Do yard work like raking leaves, weeding or pushing the lawn mower?	N	Y
10.	Have sexual relations?	N	Y
11.	Participate in moderate recreational activities like golf bowling, dancing, doubles tennis, or throwing a baseball or football?	N	Y
12.	Participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing?	N	Y

ACTIVITY EXPECTATIONS

IV. The next questions ask your opinion about your ability to carry out certain activities right now and about your confidence in your ability to do them. I will ask you to chose the response that best describes your confidence in your ability to complete each activity. There are no right or wrong answers, some activities may seem pretty easy, while others may seem pretty hard. You may have been told by your doctor or nurse that you should not do some of these activities. But for these next questions I would like you to think only about how you feel, that is how confident do you feel that you would be able to do them if you really wanted to. On a scale of 1 to 10, where 1 means you definitely could not perform the activity and 10 that you definitely could perform the activity, how confident are you that you could:

1. Eat a meal that someone has prepared for you? ____
2. Get yourself dressed? ____
3. Get yourself up to the toilet? ____
4. Walk indoors, such as around your house? ____
5. Walk a block or two on level ground? ____
6. Climb one flight of stairs (ten steps)? ____
7. Run a short distance? ____
8. Do light work around the house like dusting or washing dishes? ____
9. Do moderate work around the house like vacuuming or sweeping floors? ____
10. Do heavy work around the house like scrubbing floors? ____
11. Do light yard work like weeding? ____
12. Do heavy yard work like raking leaves or mowing the lawn? ____
13. Have sexual relations? ____
14. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football? ____
15. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing? ____

YOUR VIEWS AND OPINIONS

V. The next questions ask about the way you usually respond to life's events. Once again there are no right or wrong answers. The responses ask if you agree or disagree with the statement. This time the answer scale ranges from 0 meaning strongly disagree to 4 meaning strongly agree please chose the number that best reflects your level of agreement with the statement. Please be as honest as you can and try not to let your response to one question influence your response to other questions.

1.	In uncertain times, I usually expect the best.	0	1	2	3	4
2.	It's easy for me to relax.	0	1	2	3	4
3.	If something can go wrong for me it will.	0	1	2	3	4
4.	I always look on the bright side of things.	0	1	2	3	4
5.	I'm optimistic about my future.	0	1	2	3	4
6.	I enjoy my friends a lot.	0	1	2	3	4
7.	It's important for me to keep busy.	0	1	2	3	4
8.	I hardly ever expect things to go my way.	0	1	2	3	4
9.	Things never work out the way I want them to.	0	1	2	3	4
10.	I don't get upset too easily.	0	1	2	3	4
11.	I'm a believer in the idea that "every cloud has a silver lining".	0	1	2	3	4
12.	I rarely count on good things happening to me.	0	1	2	3	4

YOU AND YOUR PARTNER

VI. The next questions ask about the way you and your partner feel about each other. There are no right or wrong answers. The responses range from not at all like me to a great deal like me. Please be as honest as you can and try not to let your response to one question influence your response to other questions.

1.	To what extent do the two of you see eye to eye?	0	1	2	3	4
2.	How close do you feel to him/her?	0	1	2	3	4
3.	How much do you enjoy spending time with him/her?	0	1	2	3	4
4.	How much does he/she express feelings of appreciation for you and the things you do?	0	1	2	3	4
5.	How attached are you to him/her?	0	1	2	3	4
6.	How much does he/she help you?	0	1	2	3	4
7.	How much do you like to sit and talk with him/her?	0	1	2	3	4
8.	How much love do you feel for him/her?	0	1	2	3	4
9.	To what extent do the two of you share the same values?	0	1	2	3	4
10.	When you really need it, how much does he/she comfort you?	0	1	2	3	4
11.	How much do the two of you laugh together?	0	1	2	3	4
12.	How much do you confide in him/her?	0	1	2	3	4
13.	How much emotional support does he/she give you?	0	1	2	3	4
14.	To what extent do the two of you enjoy the time you spend together?	0	1	2	3	4
15.	How often does he/she express feelings of warmth toward you?	1	2	3	4	

YOUR FEELINGS

The next group of questions asks about your feelings. Place a vertical mark through the line indicating how you have been feeling in the past 12 hours including right now. For example, suppose you had not eaten for 24 hours and were asked to indicate how hungry you were, you would probably put the mark closer to the "extremely hungry" end of the line. This is where I put it:

Not at all Hungry	————————————————————	Extremely Hungry

Now, place a mark on each of the lines below to indicate how you have been feeling in the past 12 hours.

Not at all Fatigued	————————————————————	Extremely Fatigued
Not at all Anxious	————————————————————	Extremely Anxious
Not at all Confused	————————————————————	Extremely Confused
Not at all Depressed	————————————————————	Extremely Depressed
Not at all Energetic	————————————————————	Extremely Energetic
Not at all Angry	————————————————————	Extremely Angry

How many years of formal schooling did you complete?

1 Less than seventh grade
2 Completed ninth grade, but not more
3 Completed tenth or eleventh grade
4 High school graduate
5 Attended some college or post high school technical school
6 Completed four years of college
7 Completed requirements for a graduate degree
8 Other, specify ____________________

That's all my questions. Thank you for your time and cooperation. Do you have any questions you would like to ask me? After you have been at home for 3 months I will send you a questionnaire that asks you similar questions about how things have been during the convalescent period. Thanks again.

Convalescence after Cardiac Surgery: Partner's Perspective

(Predischarge Survey)

ID NUMBER: __________

Purpose: This survey is designed for persons who are the husband, wife, or significant other of an individual who has undergone cardiac surgery recently. In this survey, the term "partner" is used to refer to your husband, wife, or significant other. Your responses will help me to understand the experiences of people like you who are the partner of someone undergoing cardiac surgery. This information will be very helpful to nurses who work with cardiac surgery patients and their families.

Directions: It should take about 20 minutes to complete this survey. Answer the questions as honestly as you can; there are no correct answers. *Please* do not consult with your partner or other family members before answering the questions. It is _your_ opinion that is requested. If you have any comments about specific questions, feel free to write in the blank space around the questions, on the back cover, or on other sheets of paper.

When you are finished with the survey, please return it in the enclosed stamped envelope. Although each of the questions is important to the study, you have the right to decline to answer the questions. If there are some questions you choose not to answer, please return the survey with your other responses marked. I would appreciate whatever information you can provide.

Although I have estimated completion time to be about 20 minutes, it would be helpful for me to know how long it takes to complete the survey. Please make a note of what time you begin. **Start time:** ______________________

If you have questions about the survey or wish to contact me about the study my address and telephone number are listed below. This phone is often answered by an answering machine. Please leave your name, telephone number, and indicate that you are calling about the study; I will return your call. If you live outside the Seattle area, you may call me collect. I am most likely to be home to accept your call in the evening.

Barbara S. Levine, Ph.C., R.N.
4509 NE 71st Street
Seattle, Washington 98115
206-527-4214

GENERAL HEALTH

"Partner" refers to your husband, wife, or significant other who has undergone cardiac surgery. Please circle the number of the answer that best describes your partner or yourself.

1. How long has your *partner* had symptoms of heart disease (for example, chest pain, shortness of breath, or fatigue)?

   No symptoms until this hospitalization 1
   Symptoms for less than 1 year 2
   Symptoms for more than 1 year but less than 5 years 3
   Symptoms for more than 5 years but less than 10 years 4
   Symptoms for more than 10 years 5

2. When did the doctor first tell your *partner* about his or her heart disease (for example valve disease, angina, congestive heart failure)?

   Heart disease was just diagnosed on this admission 1
   Heart disease diagnosed within the past year 2
   Heart disease diagnosed more than 1 year but less than 5 years ago 3
   Heart disease diagnosed more than 5 years but less than 10 years ago 4
   Heart disease diagnosed more than 10 years ago 5

3. Compared to other persons your age, would you say *your health* is:

   Excellent 4
   Good 3
   Fair 2
   Poor 1

4. Have *you* ever had cardiac surgery yourself?

   NO 1
   YES 2

YOUR VIEWS AND OPINIONS

Please answer the following questions about yourself by circling the appropriate number. Be as honest as you can throughout and try not to let your responses to one question influence your response to other questions. *There are no right or wrong answers.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. In uncertain times, I usually expect the best.	0	1	2	3	4
2. It's easy for me to relax.	0	1	2	3	4
3. If something can go wrong for me it will.	0	1	2	3	4
4. I always look on the bright side of things.	0	1	2	3	4
5. I'm optimistic about my future.	0	1	2	3	4
6. I enjoy my friends a lot.	0	1	2	3	4
7. It's important for me to keep busy.	0	1	2	3	4
8. I hardly ever expect things to go my way.	0	1	2	3	4
9. Things never work out the way I want them to.	0	1	2	3	4
10. I don't get upset too easily.	0	1	2	3	4
11. I'm a believer in the idea that "every cloud has a silver lining".	0	1	2	3	4
12. I rarely count on good things happening to me.	0	1	2	3	4

YOUR FEELINGS

The next group of questions asks about your feelings. Place a vertical mark through the line indicating how you have been feeling in the past 12 hours including right now. For example, suppose you had not eaten for 24 hours and were asked to indicate how hungry you were, you would probably put the mark closer to the "extremely hungry" end of the line. This is where I put it:

Not at all Hungry	Extremely Hungry

Now, place a mark on each of the lines below to indicate how you have been feeling in the past 12 hours.

Not at all Fatigued	Extremely Fatigued
Not at all Anxious	Extremely Anxious
Not at all Confused	Extremely Confused
Not at all Depressed	Extremely Depressed
Not at all Energetic	Extremely Energetic
Not at all Angry	Extremely Angry

YOU AND YOUR PARTNER

The next questions are about how you and your partner feel about each other. Please circle the number that matches the response that best describes you: **Not at All** 0, **A Little** 1, **Some** 2, **Quite a Bit** 3, **A Great Deal** 4.

	Not at All	A Little	Some	Quite a Bit	A Great Deal
1. To what extent do the two of you see eye to eye?	0	1	2	3	4
2. How close do you feel to him or her?	0	1	2	3	4
3. How much do you enjoy sharing experiences with him or her?	0	1	2	3	4
4. How much does he or she express feelings of appreciation for you and the things you do?	0	1	2	3	4
5. How attached are you to him or her?	0	1	2	3	4
6. How much does he or she help you?	0	1	2	3	4
7. How much do you like to sit and talk with him or her?	0	1	2	3	4
8. How much love do you feel for him or her?	0	1	2	3	4
9. To what extent do the two of you share the same values?	0	1	2	3	4
10. When you really need it, how much does he or she comfort you?	0	1	2	3	4
11. How much do the two of you laugh together?	0	1	2	3	4
12. How much do you confide in him or her?	0	1	2	3	4
13. How much emotional support does he or she give you?	0	1	2	3	4
14. To what extent do the two of you enjoy the time you spend together?	0	1	2	3	4
15. How often does he or she express feelings of warmth toward you?	0	1	2	3	4

YOUR ACTIVITY EXPECTATIONS

The next questions ask your opinion about your partner's ability to carry out certain activities. You may have been told by your surgeon or nurse that he or she **should not** do some of these activities. I am interested in what you believe your partner **could do right now** if he or she wanted to. *There are no right or wrong answers.* Please circle the number that best describes your opinion.

	Definitely Not		Probably Not		Maybe		Probably Can Do		Definitely Can Do	
Could he or she ...										
1. Eat a meal that someone has prepared?	1	2	3	4	5	6	7	8	9	10
2. Get dressed?	1	2	3	4	5	6	7	8	9	10
3. Get up to the toilet?	1	2	3	4	5	6	7	8	9	10
Could he or she ...										
4. Walk indoors, such as around the house?	1	2	3	4	5	6	7	8	9	10
5. Walk a block or two on level ground?	1	2	3	4	5	6	7	8	9	10
6. Climb a flight of stairs?	1	2	3	4	5	6	7	8	9	10
Could he or she ...										
7. Run a short distance?	1	2	3	4	5	6	7	8	9	10
8. Do light housework like dusting or washing dishes?	1	2	3	4	5	6	7	8	9	10
9. Do moderate housework like vacuuming or sweeping floors?	1	2	3	4	5	6	7	8	9	10
Could he or she ...										
10. Do heavy housework like scrubbing floors?	1	2	3	4	5	6	7	8	9	10
11. Do light yard work like weeding?	1	2	3	4	5	6	7	8	9	10
12. Do heavy yard work like raking leaves or mowing the lawn?	1	2	3	4	5	6	7	8	9	10

	Definitely Not		Probably Not		Maybe		Probably Can Do		Definitely Can Do	
Could he or she...										
13. Have sexual relations?	1	2	3	4	5	6	7	8	9	10
14. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football?	1	2	3	4	5	6	7	8	9	10
15. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing?	1	2	3	4	5	6	7	8	9	10

16. How long have the two of you been married or in a committed relationship?

Less than one year 1
One to five years 2
More than five but less than ten years 3
Ten to twenty years 4
More than twenty but less than thirty years 5
Thirty to forty years 6
More than forty but less than fifty years 7
Fifty to sixty years 8
More than sixty years 9

Thank you very much for completing this survey. I believe that your participation in this study will increase nursing's knowledge about couples' experiences during convalescence after cardiac surgery.

Please make a note of what time it is now. **Completion time:** ____________

Please place the survey in the enclosed stamped envelope and return it by mail. Thank you.

CHART REVIEW FORM:

Date: ____________
Subject Number: ____________

Admit date: ____________

Date of birth: ____________

Gender:
- Female 1
- Male 2

Race:
- Asian/Pacific Islander 1
- Black 2
- Hispanic 3
- Native American Indian 4
- White 5
- Other 6

Primary illness:
- Coronary heart disease 1
- Valvular heart disease 2
- Mixed heart disease 3

NYHA functional class:
- No symptoms 0
- Symptoms with exertion 1
- Symptoms with ordinary activity 2
- Symptoms at rest 3
- Not recorded 99

Medications for cardiovascular disease:
- ACE Inhibitors 1
- Antiarrhythmics 2
- β-blockers 3
- Digoxin 4
- Diuretics 5
- Long-acting nitrates 6
- Vasodilators 7
- Ca+ channel blockers 8

Date of surgery: ____________

Scheduling priority:
- Elective 1
- Urgent 2
- Emergent 3

Surgical procedure:
- AVR 1
- CABS 2
- MVR 3
- CABS + valve 4
- DBL valve 5

Repeat operation?
- No 0
- Yes 1

Ejection fraction? ....
LVEDP? ....

Comorbidity:
- Myocardial infarction 1
- Congestive heart failure 1
- Peripheral vascular disease 1
- Cerebrovascular disease 1
- Dementia 1
- Chronic pulmonary disease 1
- Connective tissue disease 1
- Ulcer disease 1
- Mild liver disease 1
- Diabetes 1
- Hemiplegia 2
- Moderate or severe renal disease 2
- Diabetes with end organ damage 2
- Any tumor 2
- Leukemia 2
- Lymphoma 2
- Moderate or severe liver disease 3
- Metastatic solid tumor 6
- AIDS 6

ICU course:
- Bleeding requiring exploration 1
- Mechanical cardiac support 2
- Pressors ≥ 24 hours 3
- Mechanical vent. ≥ 24 hours 4
- Hemodynamically significant dysrhythmias 5
- Post-op dialysis 6
- Other 7

Length of ICU stay:
- ≤ 24 hours 1
- 25-48 hours 2
- >48 hours 3

Step-down course:
- Atrial dysrhythmias requiring Rx 1
- Ventricular dysrhythmias requiring Rx 2
- Infection 3
- Other complication 4

Did patient attend discharge classes? .... yes no
Did partner attend discharge classes? .... yes no

Date of discharge: ____________

Convalescence after Cardiac Surgery:
the Patient's Perspective

(3-month Survey)

ID NUMBER: __________

Purpose: This survey is designed for persons who are recovering after cardiac surgery. In this survey, the term "partner" is used to refer to your husband, wife, or significant other. Your responses will help me to understand the experiences of people like you who are recovering from cardiac surgery. This information will be very helpful to nurses who work with cardiac surgery patients and their families.

Directions: It should take about 30 minutes to complete this survey. Answer the questions as honestly as you can; there are no correct answers. *Please* do not consult with your partner or other family members before answering the questions. It is <u>your</u> opinion that is requested. If you have any comments about specific questions, feel free to write in the blank space around the questions, on the back cover, or on other sheets of paper.

When you are finished with the survey, please return it in the enclosed stamped envelope. Although each of the questions is important to the study, you have the right to decline to answer any question. If there are some questions you choose not to answer, please return the survey with your other responses marked. I would appreciate whatever information you can provide.

Although I have estimated completion time to be about 30 minutes, it would be helpful for me to know how long it takes to complete this questionnaire. Please make a note of the time when you begin. **Start time:** ____________________

If you have questions about the survey or wish to contact me about the study my address and telephone number follow. This phone is often answered by an answering machine, please leave your name and number and that you are calling about the study. I will return your call. If you live outside the Seattle area, you may call me collect. I am most likely to be home to accept your call in the evening.

Barbara S. Levine, Ph.C., R.N.
4509 NE 71st Street
Seattle, Washington 98115
206-527-4814

YOUR ACTIVITIES

This first set of questions is about your activities. Please place a check mark (√) on the line to indicate if you can perform the activity or not.

	YES	NO
Can you ...		
1. Take care of yourself, that is, eating, dressing or using the toilet?	___	___
2. Walk indoors, such as around your house?	___	___
3. Walk a block or two on level ground?	___	___
Can you ...		
4. Climb a flight of stairs or walk up a hill?	___	___
5. Run a short distance?	___	___
6. Do light work around the house like dusting or washing dishes?	___	___
Can you ...		
7. Do moderate work around the house like vacuuming, sweeping floors, or carrying in groceries?	___	___
8. Do heavy work around the house like scrubbing floors, lifting or moving heavy furniture?	___	___
9. Do yard work like raking leaves, weeding or pushing the lawn mower?	___	___
Can you ...		
10. Have sexual relations?	___	___
11. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football?	___	___
12. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing?	___	___

YOUR FEELINGS

The next group of questions asks about your feelings. Place a vertical mark through the line indicating how you have been feeling in the past 12 hours including right now. For example, suppose you had not eaten for 24 hours and were asked to indicate how hungry you were, you would probably put the mark closer to the "extremely hungry" end of the line. This is where I put it: →

Not at all Hungry	Extremely Hungry

Now, place a mark on each of the lines below to indicate how you have been feeling in the past 12 hours.

Not at all Fatigued	Extremely Fatigued
Not at all Anxious	Extremely Anxious
Not at all Confused	Extremely Confused
Not at all Depressed	Extremely Depressed
Not at all Energetic	Extremely Energetic
Not at all Angry	Extremely Angry

YOUR VIEWS AND OPINIONS

Please answer the following questions about yourself by circling the appropriate number. Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. *There are no right or wrong answers.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. In uncertain times, I usually expect the best.	0	1	2	3	4
2. It's easy for me to relax.	0	1	2	3	4
3. If something can go wrong for me it will.	0	1	2	3	4
4. I always look on the bright side of things.	0	1	2	3	4
5. I'm optimistic about the future.	0	1	2	3	4
6. I enjoy my friends a lot.	0	1	2	3	4
7. It's important to me to keep busy.	0	1	2	3	4
8. I hardly ever expect things to go my way.	0	1	2	3	4
9. Things never work out the way I want them to.	0	1	2	3	4
10. I don't get upset too easily.	0	1	2	3	4
11. I'm a believer in the idea that "every cloud has a silver lining".	0	1	2	3	4
12. I rarely count on good things happening to me.	0	1	2	3	4

YOUR EXPERIENCES — PART 1

The next set of questions asks about your experiences since your surgery. In the first column circle NO N if you did not have the experience. Circle YES Y if you did have the experience. If you circled YES in the first column, please indicate how hard the experience was for you by circling the number that best describes how hard it was: **Very Hard** 5, **Pretty Hard** 4, **Somewhat Hard** 3, **Not too Hard** 2, or **Easy** 1.

If YES, circle how hard the experience was for you.

In the time since your surgery, did you have this experience?	NO	YES	Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
1. Did you have pain from your *chest* incision?	N	Y	5	4	3	2	1
2. Did you have swelling in your hands or feet?	N	Y	5	4	3	2	1
3. Did you have aching in your back or shoulders?	N	Y	5	4	3	2	1
4. Did you have the sensation of your heart pounding?	N	Y	5	4	3	2	1
5. Did you get short of breath?	N	Y	5	4	3	2	1
6. Did you have a change in your appetite?	N	Y	5	4	3	2	1
7. Did you have angina?	N	Y	5	4	3	2	1
8. Did you have a change in your vision?	N	Y	5	4	3	2	1
9. Did you have numbness in your hand or fingers?	N	Y	5	4	3	2	1
10. Did you have trouble sleeping?	N	Y	5	4	3	2	1
11. Did you have trouble with your memory or forgetfulness?	N	Y	5	4	3	2	1

In the time since your surgery, did you have this experience?	NO	YES	Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
			If YES, circle how hard the experience was for you				
12. Did you feel anxious or tense?	N	Y	5	4	3	2	1
13. Did you feel sad or depressed?	N	Y	5	4	3	2	1
14. Did you have frequent mood changes?	N	Y	5	4	3	2	1
15. Have you been fatigued?	N	Y	5	4	3	2	1
16. Have you been hospitalized overnight for cardiac problems?	N	Y	5	4	3	2	1
17. Have you cut back or tried to quit smoking? *(Circle N if you did not smoke before surgery.)*	N	Y	5	4	3	2	1
18. Have you tried to reduce the amount of salt you use?	N	Y	5	4	3	2	1
19. Have you tried to reduce the fat or cholesterol in your diet?	N	Y	5	4	3	2	1
20. Have you been exercising at least three times a week?	N	Y	5	4	3	2	1
21. Did you "cut back" on your usual chores (gardening, errands, etc.)?	N	Y	5	4	3	2	1
22. Did you "cut back" on things you usually do with your children or grandchildren? *(Circle N if you do not have children or grandchildren)*	N	Y	5	4	3	2	1
23. Did you "cut back" on things you usually do for fun?	N	Y	5	4	3	2	1

If YES, circle how hard the experience was for you.

In the time since your surgery, did you have this experience?	NO	YES	Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
24. Did you "cut back" on the frequency of sexual relations?	N	Y	5	4	3	2	1
25. Did you "cut back" on the things you usually do with friends?	N	Y	5	4	3	2	1
26. Did you "cut back" on the things you usually do with your family?	N	Y	5	4	3	2	1
27. Did you "cut back" or quit your job since your surgery? *(Circle N if you were retired before surgery.)*	N	Y	5	4	3	2	1
28. Did the surgery cause you financial concerns?	N	Y	5	4	3	2	1
29. Did you feel that your partner was over protecting you?	N	Y	5	4	3	2	1
30. Did you and your partner disagree about your activity?	N	Y	5	4	3	2	1
31. Did your partner worry about your health?	N	Y	5	4	3	2	1
32. Did you and your partner get on each other's nerves?	N	Y	5	4	3	2	1
33. Did you feel like your partner expected too much of you?	N	Y	5	4	3	2	1
34. Did you feel "left out" of family decisions?	N	Y	5	4	3	2	1
35. Overall, how hard was recovery for you? →			5	4	3	2	1

YOUR EXPERIENCES — PART 2

The following questions ask how satisfied you are with your experiences in recovery. Please circle the appropriate number to indicate your overall level of satisfaction: **Highly Satisfied 5, Somewhat Satisfied 4, Neutral 3, Somewhat Dissatisfied 2**
Highly Dissatisfied 1.

Overall, how satisfied are you ...	Highly Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Highly Dissatisfied
1. With your physical progress in recovery?	5	4	3	2	1
2. With your ability to do the things you *really want* to do?	5	4	3	2	1
3. With recovery in your thoughts and feelings?	5	4	3	2	1
4. With the physical help provided by your partner?	5	4	3	2	1
5. With the affection expressed to you by your partner?	5	4	3	2	1
6. With the level of concern expressed by your partner?	5	4	3	2	1
7. With your partner's willingness to help you?	5	4	3	2	1
8. That your partner really understood what you were going through?	5	4	3	2	1
9. With your ability to "follow the doctor's orders" for recovery?	5	4	3	2	1
10. With your ability to tolerate the discomforts experienced in recovery?	5	4	3	2	1
11. With the communication between you and your partner during recovery?	5	4	3	2	1
12. That you have contributed to your partner's happiness despite the limitations imposed by your surgery?	5	4	3	2	1

RECOVERY OVERALL

This group of questions asks you to describe your experiences in your own words. Please write a short answer to each question. *There are no right or wrong answers,* I am interested in *your* experience.

1. Considering everything involved in convalescence after cardiac surgery, what things were most difficult for you?

2. Considering everything involved in convalescence after cardiac surgery, what things were most satisfying to you?

3. Were there specific actions you performed or things you did that you believe made a difference in the convalescent experience? If so, what were those things and how did they make a difference?

4. Is there anything else about your experience during convalescence that you would like me to know?

On the next page is the last set of questions. These questions ask about your feelings over the past 12 hours. Fill in the space under the answer that best describes how you have been feeling. Please answer all of the questions. ***It is not necessary for you to fill in your name, the date, or your sex.***

NAME ______________________ DATE __________

SEX: MALE ☐ FEMALE ☐

IDENTIFICATION

BELOW IS A LIST OF WORDS THAT DESCRIBE FEELINGS PEOPLE HAVE. PLEASE READ EACH ONE CAREFULLY. THEN FILL IN ONE SPACE UNDER THE ANSWER TO THE RIGHT WHICH BEST DESCRIBES HOW YOU HAVE BEEN FEELING DURING THE PAST 12 HOURS.

THE NUMBERS REFER TO THESE PHRASES:
- 0 = NOT AT ALL
- 1 = A LITTLE
- 2 = MODERATELY
- 3 = QUITE A BIT
- 4 = EXTREMELY

	0 NOT AT ALL	1 A LITTLE	2 MODERATELY	3 QUITE A BIT	4 EXTREMELY
1. FRIENDLY	0	1	2	3	4
2. TENSE	0	1	2	3	4
3. ANGRY	0	1	2	3	4
4. WORN OUT	0	1	2	3	4
5. UNHAPPY	0	1	2	3	4
6. CLEAR-HEADED	0	1	2	3	4
7. LIVELY	0	1	2	3	4
8. CONFUSED	0	1	2	3	4
9. SORRY FOR THINGS DONE	0	1	2	3	4
10. SHAKY	0	1	2	3	4
11. LISTLESS	0	1	2	3	4
12. PEEVED	0	1	2	3	4
13. CONSIDERATE	0	1	2	3	4
14. SAD	0	1	2	3	4
15. ACTIVE	0	1	2	3	4
16. ON EDGE	0	1	2	3	4
17. GROUCHY	0	1	2	3	4
18. BLUE	0	1	2	3	4
19. ENERGETIC	0	1	2	3	4
20. PANICKY	0	1	2	3	4
21. HOPELESS	0	1	2	3	4
22. RELAXED	0	1	2	3	4
23. UNWORTHY	0	1	2	3	4
24. SPITEFUL	0	1	2	3	4
25. SYMPATHETIC	0	1	2	3	4
26. UNEASY	0	1	2	3	4
27. RESTLESS	0	1	2	3	4
28. UNABLE TO CONCENTRATE	0	1	2	3	4
29. FATIGUED	0	1	2	3	4
30. HELPFUL	0	1	2	3	4
31. ANNOYED	0	1	2	3	4
32. DISCOURAGED	0	1	2	3	4
33. RESENTFUL	0	1	2	3	4
34. NERVOUS	0	1	2	3	4
35. LONELY	0	1	2	3	4
36. MISERABLE	0	1	2	3	4
37. MUDDLED	0	1	2	3	4
38. CHEERFUL	0	1	2	3	4
39. BITTER	0	1	2	3	4
40. EXHAUSTED	0	1	2	3	4
41. ANXIOUS	0	1	2	3	4
42. READY TO FIGHT	0	1	2	3	4
43. GOOD NATURED	0	1	2	3	4
44. GLOOMY	0	1	2	3	4
45. DESPERATE	0	1	2	3	4
46. SLUGGISH	0	1	2	3	4
47. REBELLIOUS	0	1	2	3	4
48. HELPLESS	0	1	2	3	4
49. WEARY	0	1	2	3	4
50. BEWILDERED	0	1	2	3	4
51. ALERT	0	1	2	3	4
52. DECEIVED	0	1	2	3	4
53. FURIOUS	0	1	2	3	4
54. EFFICIENT	0	1	2	3	4
55. TRUSTING	0	1	2	3	4
56. FULL OF PEP	0	1	2	3	4
57. BAD-TEMPERED	0	1	2	3	4
58. WORTHLESS	0	1	2	3	4
59. FORGETFUL	0	1	2	3	4
60. CAREFREE	0	1	2	3	4
61. TERRIFIED	0	1	2	3	4
62. GUILTY	0	1	2	3	4
63. VIGOROUS	0	1	2	3	4
64. UNCERTAIN ABOUT THINGS	0	1	2	3	4
65. BUSHED	0	1	2	3	4

T D A V F C

MAKE SURE YOU HAVE ANSWERED EVERY ITEM.

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Thank you very much for completing this survey. I believe your answers will increase nursing's knowledge about couples' experiences during convalescence from cardiac surgery. Would you take a few more minutes to share your candid reactions to the survey? (Please circle the number associated with your answer.)

1. Were the questions relevant to your experience?
   1 Very relevant
   2 Pretty relevant
   3 Somewhat relevant and somewhat irrelevant
   4 Pretty irrelevant
   5 Very irrelevant

2. Were the questions on the survey clear or confusing?
   1 Everything was clear
   2 Most questions were clear; only a few were confusing
   3 Some questions were clear and some were confusing
   4 Only a few questions were clear; most were confusing
   5 Nearly all the questions were confusing

   What question or page of questions was most confusing?

3. Were the questions in general emotionally upsetting to you?
   1 Not at all
   2 A little
   3 Some
   4 A lot

   What question or page of questions was most emotionally upsetting to you?

4. Would you be willing to be contacted for further follow-up in the future?
   1 NO
   2 YES

   If you are willing to be contacted in the future, please list the name and telephone number of someone who would know how to reach you if you were to leave your current address. ______________________________

5. Please make a note of the current time. **Completion time:** ______________

Please place the survey in the enclosed stamped envelope and return it by mail. If you have misplaced the envelope or have questions regarding the survey, my address and telephone number are on the inner front cover of this survey.
Again, your participation in this research study is greatly appreciated!

Convalescence after Cardiac Surgery: the Partner's Perspective

(3-month Survey)

ID NUMBER: __________

Purpose: This survey is designed for persons who are the husband, wife, or significant other of an individual who has recently had cardiac surgery. In this survey, the term "partner" is used to refer to your husband, wife, or significant other. Your responses will help me to understand the experiences of people like you who are the partner of someone recovering from cardiac surgery. This information will be very helpful to nurses who work with cardiac surgery patients and their families.

Directions: It should take about 30 minutes to complete this survey. Answer the questions as honestly as you can; there are no correct answers. *Please* do not consult with your partner or other family members before answering the questions. It is *your* opinion that is requested. If you have any comments about specific questions, feel free to write in the blank space around the questions, on the back cover, or on other sheets of paper.

When you are finished with the survey, please return it in the enclosed stamped envelope. Although each of the questions is important to the study, you have the right to decline to answer any question. If there are some questions you choose not to answer, please return the survey with your other responses marked. I would appreciate whatever information you can provide.

Although I have estimated completion time to be about 30 minutes, it would be helpful for me to know how long it takes to complete this survey. Please make a note of the time you begin. **Start Time:** ________________

If you have questions about the survey or wish to contact me about the study my address and telephone number follow. This phone is often answered by an answering machine, please leave your name and number and that you are calling about the study. I will return your call. If you live outside the Seattle area, you may call me collect. I am most likely to be home to accept your call in the evening.

Barbara S. Levine, Ph.C., R.N.
4509 NE 71st Street
Seattle, Washington 98115
206-527-4814

YOUR EXPERIENCES — PART 1

The first set of questions asks about your experiences since your partner's surgery. In the first column circle NO (N) if you did not have the experience. Circle YES (Y) if you did have the experience. If you circled YES in the first column, please indicate how hard the experience was for you by circling the number that best describes how hard it was: **Very Hard** (5), **Pretty Hard** (4) **Somewhat Hard** (3), **Not Too Hard** (2), or **Easy** (1).

If YES, circle how hard the experience was for you.

In the time since surgery, did you or your partner have this experience?	NO	YES	Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
1. Did your *partner* have chest pain that worried you?	N	Y	5	4	3	2	1
2. Did your *partner* have shortness of breath that worried you?	N	Y	5	4	3	2	1
3. Did your *partner* have fatigue that worried you?	N	Y	5	4	3	2	1
4. Has your *partner* experienced mood swings?	N	Y	5	4	3	2	1
5. Has your *partner* been irritable or hard to get along with?	N	Y	5	4	3	2	1
6. Has your *partner* been sad or depressed?	N	Y	5	4	3	2	1
7. Has your *partner* had trouble remembering things?	N	Y	5	4	3	2	1
8. Has your *partner* been confused?	N	Y	5	4	3	2	1
9. Did *you* help your partner to evaluate symptoms? *(Such as incisional versus anginal pain.)*	N	Y	5	4	3	2	1

In the time since surgery, did you or your partner have this experience?	NO	YES	*If YES, circle how hard the experience was for you.* Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
10. Did *you* call or talk to the doctor for him/her?	N	Y	5	4	3	2	1
11. Did *you* physically help your partner with walking?	N	Y	5	4	3	2	1
12. Did *you* help your partner with bathing?	N	Y	5	4	3	2	1
13. Did *you* help your partner with medications?	N	Y	5	4	3	2	1
14. Did *you* prepare special meals for your partner?	N	Y	5	4	3	2	1
15. Did *you* change *your* usual meals? *(For example, eat only things your partner wanted)*	N	Y	5	4	3	2	1
16. Did helping your partner interrupt *your* usual sleep pattern?	N	Y	5	4	3	2	1
17. Has your *partner* tried to do "too much"?	N	Y	5	4	3	2	1
18. Has your *partner* tried to cut back or quit smoking? *(Circle N if partner didn't smoke before surgery.)*	N	Y	5	4	3	2	1
19. Has your *partner* chosen not to quit smoking? *(Circle N if partner didn't smoke before surgery.)*	N	Y	5	4	3	2	1
20. Have *you* tried to change your own diet? *(For example, decrease salt or fat.)*	N	Y	5	4	3	2	1
21. Have *you* tried to exercise with your partner?	N	Y	5	4	3	2	1

In the time since surgery, did you or your partner have this experience?	NO	YES	Very Hard	Pretty Hard	Somewhat Hard	Not too Hard	Easy
			If YES, circle how hard the experience was for you.				
22. Have *you* tried to cut back or quit smoking? (*Circle N if you didn't smoke before the surgery.*)	N	Y	5	4	3	2	1
23. Have *you* "taken on" responsibilities or chores that your partner would usually do?	N	Y	5	4	3	2	1
24. Did *you* "cut back" on things you usually do with your children or grandchildren?	N	Y	5	4	3	2	1
25. Did *you* "cut back" on things you do for fun?	N	Y	5	4	3	2	1
26. Did *you* "cut back" on things you usually do with friends?	N	Y	5	4	3	2	1
27. Did *you* take time off or quit your job to help your partner in recovery?	N	Y	5	4	3	2	1
28. Did the surgery cause *you* financial concerns?	N	Y	5	4	3	2	1
29. Did *you* and *your partner* disagree about his/her activity?	N	Y	5	4	3	2	1
30. Did *you* and *your partner* get on each others nerves?	N	Y	5	4	3	2	1
31. Did *you* and *your partner* "cut back" on the frequency of sexual relations?	N	Y	5	4	3	2	1
32. Did *you* try to protect your partner from family problems?	N	Y	5	4	3	2	1
33. Overall, how hard has the recovery period been for *you*? →			5	4	3	2	1

YOUR EXPERIENCES — PART 2

The following questions ask how satisfied you are with your experiences in recovery. Please circle the appropriate number to indicate your overall level of satisfaction:
Highly Satisfied 5, Somewhat Satisfied 4, Neutral 3, Somewhat Dissatisfied 2, Highly Dissatisfied 1.

Overall, how satisfied are you ...	Highly Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Highly Dissatisfied
1. With your partner's physical progress in recovery?	5	4	3	2	1
2. With your partner's recovery in his or her thoughts and feelings?	5	4	3	2	1
3. With your partner's *efforts* to follow the "doctor's orders" for recovery?	5	4	3	2	1
4. With your partner's *ability* to follow the "doctor's orders" for recovery?	5	4	3	2	1
5. With the appreciation expressed by your partner for your help?	5	4	3	2	1
6. With the affection expressed to you by your partner?	5	4	3	2	1
7. With your partner's willingness to let you help?	5	4	3	2	1
8. With your own ability to help him or her?	5	4	3	2	1
9. With your own strength in providing care or helping your partner?	5	4	3	2	1
10. With the communication between you and your partner during convalescence?	5	4	3	2	1
11. That you have really understood what your partner was going through?	5	4	3	2	1
12. That you have contributed to your partner's progress in recovery?	5	4	3	2	1

YOUR FEELINGS

The next group of questions asks about your feelings. Place a vertical mark through the line indicating how you have been feeling in the past 12 hours including right now. For example, suppose you had not eaten for 24 hours and were asked to indicate how hungry you were, you would probably put the mark closer to the "extremely hungry" end of the line. This is where I put it:

Not at all Hungry	Extremely Hungry

Now, place a mark on each of the lines below to indicate how you have been feeling in the past 12 hours.

Not at all Fatigued	Extremely Fatigued
Not at all Anxious	Extremely Anxious
Not at all Confused	Extremely Confused
Not at all Depressed	Extremely Depressed
Not at all Energetic	Extremely Energetic
Not at all Angry	Extremely Angry

YOUR VIEWS AND OPINIONS

Please answer the following questions about yourself by circling the appropriate number. Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. *There are no right or wrong answers.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. In uncertain times, I usually expect the best.	0	1	2	3	4
2. It's easy for me to relax.	0	1	2	3	4
3. If something can go wrong for me it will.	0	1	2	3	4
4. I always look on the bright side of things.	0	1	2	3	4
5. I'm optimistic about the future.	0	1	2	3	4
6. I enjoy my friends a lot.	0	1	2	3	4
7. It's important to me to keep busy.	0	1	2	3	4
8. I hardly ever expect things to go my way.	0	1	2	3	4
9. Things never work out the way I want them to.	0	1	2	3	4
10. I don't get upset too easily.	0	1	2	3	4
11. I'm a believer in the idea that "every cloud has a silver lining".	0	1	2	3	4
12. I rarely count on good things happening to me.	0	1	2	3	4

RECOVERY OVERALL

This group of questions asks you to describe your experiences in your own words. Please write a short answer to each question. There are no right or wrong answers, I am interested in *your* experience.

1. Considering everything involved in convalescence after cardiac surgery, what things were most difficult for you?

2. Considering everything involved in convalescence after cardiac surgery, what things were most satisfying to you?

3. Considering everything involved in convalescence after cardiac surgery, did you feel adequately prepared for the experience?

4. Were there specific actions you performed or things you did that you believe made a difference in the convalescent experience? If so, what were those things and how did they make a difference?

5. Is there anything else about your experience during convalescence that you would like me to know?

ABOUT YOU

Please circle the number of the associated with your answer.

1. Are you female or male?
   - 1 Female
   - 2 Male

2. Which ethnic or racial group best describes you?
   - 1 Asian or Pacific Islander
   - 2 African American
   - 3 Mexican American
   - 4 Native American Indian
   - 5 Caucasian
   - 6 Other (specify) ______________________

3. How many years of formal schooling did you complete?
   - 1 Less than seventh grade
   - 2 Completed ninth grade, but not more
   - 3 Completed tenth or eleventh grade
   - 4 High school graduate
   - 5 Attended some college or post high school technical school
   - 6 Completed four years of college
   - 7 Completed requirements for graduate degree
   - 8 Other (specify) ______________________

4. What is your current occupation? ______________________

5. If retired, what was your occupation prior to retirement?

   ____

6. Did you attend any classes at the hospital to prepare you for convalescence?
   - 1 NO
   - 2 YES

7. In what year were you born? *(Fill in the blank.)* ______________

The next set of questions asks about your feelings over the past 12 hours. Fill in the space under the answer that best describes how you have been feeling. Please answer all of the questions. ***It is not necessary for you to fill in your name, the date, or your sex.***

NAME ______________________ DATE __________

SEX: MALE ☐ FEMALE ☐

BELOW IS A LIST OF WORDS THAT DESCRIBE FEELINGS PEOPLE HAVE. PLEASE READ EACH ONE CAREFULLY. THEN FILL IN ONE SPACE UNDER THE ANSWER TO THE RIGHT WHICH BEST DESCRIBES HOW YOU HAVE BEEN FEELING DURING THE PAST 12 HOURS.

IDENTIFICATION

THE NUMBERS REFER TO THESE PHRASES:
0 = NOT AT ALL
1 = A LITTLE
2 = MODERATELY
3 = QUITE A BIT
4 = EXTREMELY

(0 NOT AT ALL, 1 A LITTLE, 2 MODERATELY, 3 QUITE A BIT, 4 EXTREMELY)

T
1. FRIENDLY
2. TENSE

D
3. ANGRY
4. WORN OUT
5. UNHAPPY

A
6. CLEAR-HEADED
7. LIVELY
8. CONFUSED

V
9. SORRY FOR THINGS DONE
10. SHAKY
11. LISTLESS

F
12. PEEVED
13. CONSIDERATE
14. SAD

C
15. ACTIVE
16. ON EDGE
17. GROUCHY
18. BLUE
19. ENERGETIC
20. PANICKY
21. HOPELESS
22. RELAXED
23. UNWORTHY
24. SPITEFUL
25. SYMPATHETIC
26. UNEASY
27. RESTLESS
28. UNABLE TO CONCENTRATE
29. FATIGUED
30. HELPFUL
31. ANNOYED
32. DISCOURAGED
33. RESENTFUL
34. NERVOUS
35. LONELY
36. MISERABLE
37. MUDDLED
38. CHEERFUL
39. BITTER
40. EXHAUSTED
41. ANXIOUS
42. READY TO FIGHT
43. GOOD NATURED
44. GLOOMY
45. DESPERATE
46. SLUGGISH
47. REBELLIOUS
48. HELPLESS
49. WEARY
50. BEWILDERED
51. ALERT
52. DECEIVED
53. FURIOUS
54. EFFICIENT
55. TRUSTING
56. FULL OF PEP
57. BAD-TEMPERED
58. WORTHLESS
59. FORGETFUL
60. CAREFREE
61. TERRIFIED
62. GUILTY
63. VIGOROUS
64. UNCERTAIN ABOUT THINGS
65. BUSHED

MAKE SURE YOU HAVE ANSWERED EVERY ITEM.

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Thank you very much for completing this survey. I believe your answers will increase nursing's knowledge about couples' experiences during convalescence from cardiac surgery. Would you take a few more minutes to share your candid reactions to the survey? (Please circle the number associated with your answer.)

1. Were the questions relevant to your experience?
   1 Very relevant
   2 Pretty relevant
   3 Somewhat relevant and somewhat irrelevant
   4 Pretty irrelevant
   5 Very irrelevant

2. Were the questions on the questionnaire clear or confusing?
   1 Everything was clear
   2 Most questions were clear; only a few were confusing
   3 Some questions were clear and some were confusing
   4 Only a few questions were clear; most were confusing
   5 Nearly all the questions were confusing

   What question or page of questions was most confusing?

3. Were the questions in general emotionally upsetting to you?
   1 Not at all
   2 A little
   3 Some
   4 A lot

   What question or page of questions was most emotionally upsetting to you?

4. Would you be willing to be contacted for further follow-up in the future?
   1 NO
   2 YES

If you are willing to be contacted in the future, please list the name and telephone number of someone who would know how to reach you if you were to leave your current address. ______________________________

5. Please make a note of the time now. **Completion time:** ______________

Place the survey in the enclosed stamped envelope and return it by mail. If you have misplaced the envelope or have questions regarding the survey, my address and telephone number are on the inner front cover of this survey. *Again, your participation in this research study is greatly appreciated!*

Appendix D

Correspondence with Study Participants

CONVALESCENCE AFTER CARDIAC SURGERY

Dissertation Research sponsored by the Oregon Health Sciences University

Dear

It is now approximately three months since your heart surgery. You probably remember that you agreed to be contacted at this time about your experiences during convalescence. The initial information you provided has gotten the study off to a good start. Your continued participation is very important to the success of this project.

The enclosed survey includes questions about your experiences during convalescence up to this time. There are no right or wrong answers to any of the questions, please answer as honestly as possible. It is expected that it will take you approximately 30 to 45 minutes to complete the survey. Please do not discuss the questions with your partner until both of you have completed and mailed your surveys. Although it may be tempting, please do not change your answers based on your partner's opinions. While the experience is a shared experience, it is expected that you will have both similar and dissimilar responses to that experience.

When you signed the consent form you were told that your participation in this study is voluntary, you may decline to answer any of the questions, and you may withdraw from the study without affecting your continuing relationship with the University or the care provided to you. Within a week you will receive a post card thanking you for your continued participation and reminding you to return the survey. Please return the survey in the enclosed envelope even if you are unable to complete it, or choose not to continue with the study. If I do not hear from you, a replacement questionnaire will be sent in one month. No further contact will be initiated by me after that time. If you wish to contact me, my home phone number is 206-527-4814. An answering machine usually answers that phone. If you leave a message with your phone number, I will return your call.

You have been assured of complete confidentiality, neither your name nor any identifying characteristics will be included in any publications. The identification number on the survey will allow me to compare your responses with your previous responses and with your partner's responses. The results of this study will be available in the Oregon Health Sciences Library in Portland in the summer of 1993.

Thank you for your sharing of your time, your experiences, your views and opinions.

Sincerely yours,

Barbara S. Levine, Ph.C., R.N.-C. • 4509 NE 71st Street • Seattle, Washington 98115 • 206-527-4814

CONVALESCENCE AFTER CARDIAC SURGERY

Dissertation Research sponsored by the Oregon Health Sciences University

Dear

It is now approximately three months since your partner's heart surgery. You probably remember that you agreed to be contacted at this time about your experiences during convalescence. The initial information you provided has gotten the study off to a good start. Your continued participation is very important to the success of this project.

The enclosed survey includes questions about your experiences during convalescence up to this time. There are no right or wrong answers to any of the questions, please answer as honestly as possible. It is expected that it will take you approximately 30 to 45 minutes to complete the survey. Please do not discuss the questions with your partner until both of you have completed and mailed your surveys. Although it may be tempting, please do not change your answers based on your partner's opinions. While the experience is a shared experience, it is expected that you will have both similar and dissimilar responses to that experience.

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Thank you for your sharing of your time, your experiences, your views and opinions.

Sincerely yours,

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Post Card Thank You and Friendly Reminder Mailed 1 Week After 3-month Survey

Last week a survey about your experiences since surgery was mailed to you. This survey can only be sent to a limited number of persons and your responses are very important.

If you have already completed and returned the survey please accept my sincere thanks. If not, please do so today. If by some chance you did not receive the survey, or it got misplaced, please call me right now (206-527-4814), leave your name and address and I will get another one in the mail to you today.

If I have not received your returned questionnaire in three weeks, I will send you a replacement package.

Sincerely,

Barbara S. Levine, Ph.C., R.N.

CONVALESCENCE AFTER CARDIAC SURGERY

Dissertation Research sponsored by the Oregon Health Sciences University

Dear

It is now approximately four months since your heart surgery. You probably remember that you agreed to be contacted at three months about your experiences during convalescence. The initial information you provided has gotten the study off to a good start. The three month survey was mailed last month and, as of today, I have not received your completed survey.

I am writing to you again because your continued participation is so important to the success of this project. As I mentioned in my last letter, the enclosed survey includes questions about your experiences during convalescence up to this time. There are no right or wrong answers to any of the questions, please answer as honestly as possible. It is expected that it will take you approximately 30 to 45 minutes to complete the survey. Please do not discuss the questions with your partner until both of you have completed and mailed your surveys. Although it may be tempting, please do not change your answers based on your partner's opinions. While the experience is a shared experience, it is expected that you will have both similar and dissimilar responses to that experience.

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CONVALESCENCE AFTER CARDIAC SURGERY

Dissertation Research sponsored by the Oregon Health Sciences University

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Thank you for your sharing of your time, your experiences, your views and opinions.

Sincerely yours,

Barbara S. Levine, Ph.C., R.N.-C. • 4509 NE 71st Street • Seattle, Washington 98115 • 206-527-4814

Appendix E

Item Level Descriptive and Psychometric Statistics for New Measures

Item Level Descriptive and Psychometric Statistics, Recovering Individual Physical Efficacy

	Confidence Mean (SD)	Confidence Range	Weighted Mean (SD)	Weighted Ramge	Weighted Item-Total Correlation
How confident are you that you could ...					
1. Eat a meal that someone has prepared for you? (1.0 METS)	7.91 (2.83)	1 – 10	7.91 (2.83)	1.0 – 10.0	.195
2. Get yourself dressed? (3.0 METS)	8.71 (2.10)	1 – 10	26.12 (6.29)	3.0 – 30.0	.470
3. Get yourself up to the toilet? (3.0 METS)	9.51 (1.39)	1 – 10	28.53 (4.17)	3.0 – 30.0	.289
4. Walk indoors such as around your house? (1.75 METS)	9.51 (1.14)	4 – 10	16.64 (2.00)	7.0 – 17.5	.338
5. Walk a block or two on level ground? (2.75 METS)	6.48 (2.78)	1 – 10	17.82 (7.65)	2.75 – 27.5	.643
6. Climb one flight of stairs or walk up a hill? (5.5 METS)	6.29 (3.06)	1 – 10	34.61 (16.82)	5.5 – 55.0	.609
7. Run a short distance? (8.0 METS)	2.27 (2.02)	1 – 9	18.19 (16.17)	8.0 – 72.0	.738
8. Do light work around the house like dusting or washing dishes? (2.7 METS)	7.01 (2.99)	1 – 10	18.93 (16.17)	2.7 – 27.0	.617
9. Do moderate work around the house like vacuuming or sweeping floors? (3.5 METS)	5.05 (3.30)	1 – 10	17.67 (11.56)	3.5 – 35.0	.783
10. Do heavy work around the house like scrubbing floors or moving furniture? (8.0 METS)	2.57 (2.60)	1 –10	20.53 (20.80)	8.0 – 80.0	.601
11. Do light yard work like weeding? (4.0 METS)	3.72 (2.93)	1 – 10	14.89 (11.74)	4.0 – 40.0	.745

(Table continues)

Item Level Descriptive and Psychometric Statistics, Recovering Individual Physical Efficacy

	Confidence Mean (SD)	Confidence Range	Weighted Mean (SD)	Weighted Ramge	Weighted Item-Total Correlation
How confident are you that you could ...					
12. Do heavy yard work like raking leaves or mowing the lawn? (4.5 METS)	2.48 (2.43)	1 – 10	11.16 (10.95)	4.5 – 45.0	.734
13. Have sexual relations? (5.25 METS)	2.85 (2.59)	1 – 10	14.99 (13.58)	5.25 – 52.5	.458
14. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football? (6.0 METS)	2.57 (2.50)	1 – 10	15.40 (15.00)	6.00 – 60.0	.660
15. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing? (8.0 METS)	1.49 (1.58)	1 – 10	11.18 (11.86)	7.5 – 75.0	.485

Item Level Descriptive and Psychometric Statistics, Partner Physical Efficacy

	Confidence Mean (SD)	Confidence Range	Weighted Mean (SD)	Weighted Ramge	Weighted Item-Total Correlation
How confident are you that your partner could...					
1. Eat a meal that someone has prepared? (1.0 METS)	8.10 (2.25)	1 – 10	8.11 (2.24)	1.0 – 10.0	.227
2. Get him/her self dressed? (3.0 METS)	7.69 (2.53)	1 – 10	23.13 (7.57)	3.0 – 30.0	.506
3. Get him/her self up to the toilet? (3.0 METS)	9.00 (1.74)	3 – 10	27.00 (5.20)	9.0 – 30.0	.396
4. Walk indoors such as around the house? (1.75 METS)	8.70 (1.94)	1 – 10	15.25 (3.38)	1.75 – 17.5	.501
5. Walk a block or two on level ground? (2.75 METS)	5.06 (3.14)	1 – 10	13.94 (8.59)	2.75 – 27.5	.771
6. Climb one flight of stairs or walk up a hill? (5.5 METS)	4.80 (3.17)	1 – 10	26.68 (17.59)	5.5 – 55.0	.699
7. Run a short distance? (8.0 METS)	1.79 (1.42)	1 – 8	14.26 (11.29)	8.0 – 64.0	.696
8. Do light work around the house like dusting or washing dishes? (2.7 METS)	4.29 (3.02)	1 – 10	11.60 (8.11)	2.7 – 27.0	.780
9. Do moderate work around the house like vacuuming or sweeping floors? (3.5 METS)	2.32 (2.15)	1 – 10	8.06 (7.49)	3.5 – 35.0	.697
10. Do heavy work around the house like scrubbing floors or moving furniture? (8.0 METS)	1.40 (0.96)	1 –7	11.17 (7.68)	8.0 – 56.0	.625
11. Do light yard work like weeding? (4.0 METS)	1.89 (1.67)	1 – 8	7.53 (6.65)	4.0 – 32.0	.637

(Table continues)

Item Level Descriptive and Psychometric Statistics, Partner Physical Efficacy

	Confidence Mean (SD)	Confidence Range	Weighted Mean (SD)	Weighted Ramge	Weighted Item-Total Correlation
How confident are you that your partner could...					
12. Do heavy yard work like raking leaves or mowing the lawn? (4.5 METS)	1.31 (0.80)	1 – 6	5.88 (3.59)	4.5 – 27.0	.562
13. Have sexual relations? (5.25 METS)	2.75 (1.95)	1 – 7	14.33 (10.23)	5.25 – 36.75	.513
14. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis, or throwing a baseball or football? (6.0 METS)	1.65 (1.29)	1 – 7	9.86 (7.71)	6.00 – 42.0	.595
15. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing? (8.0 METS)	1.19 (0.55)	1 – 4	8.91 (4.07)	7.5 – 30.0	.576

Item Level Descriptive and Psychometric Statistics, Recovery Demands

Item	*M*	*SD*	Range	Item-Total Correlation
1. Did you have pain from your chest incision?	0.68	0.47	0 – 1	.25
2. Did you have swelling in your hands and feet?	0.51	0.50	0 – 1	.05
3. Did you have aching in your back or shoulders?	0.47	0.50	0 – 1	.25
4. Did you have the sensation of your heart pounding?	0.58	0.50	0 – 1	.13
5. Did you get short of breath?	0.48	0.50	0 – 1	.23
6. Did you have a change in appetite?	0.54	0.50	0 – 1	.24
7. Did you have angina?	0.11	0.32	0 – 1	-.00
8. Did you have a change in your vision?	0.32	0.47	0 – 1	.27
9. Did you have numbness in your hands or fingers?	0.21	0.41	0 – 1	.24
10. Did you have trouble sleeping?	0.58	0.50	0 – 1	.27
11. Did you have trouble with your memory or forgetfulness?	0.43	0.50	0 – 1	.43
12. Did you feel anxious or tense?	0.47	0.50	0 – 1	.35
13. Did you feel sad or depressed?	0.33	0.47	0 – 1	.37
14. Did you have frequent changes in mood?	0.26	0.44	0 – 1	.51
15. Have you been fatigued?	0.81	0.40	0 – 1	.41
16. Have you been hospitalized over night for cardiac problems?	0.23	0.42	0 – 1	.25
17. Have you cut back or tried to quit smoking?	0.03	0.17	0 – 1	-.09
18. Have you tried to reduce the amount of salt you use?	0.78	0.41	0 – 1	-.04
19. Have you tried to reduce the amount of fat or cholesterol in your diet?	0.85	0.36	0 – 1	-.06
20. Have you been exercising at least three times a week?	0.91	0.28	0 – 1	.03
21. Did you "cut back" on your usual chores (gardening, errands, etc.)?	0.76	0.43	0 – 1	.42

Item Level Descriptive and Psychometric Statistics, Recovery Demands

Item	*M*	*SD*	Range	Item-Total Correlation
22. Did you "cut back" on things you usually do with children or grandchildren?	0.31	0.47	0 – 1	.41
23. Did you "cut back" on things you usually do for fun?	0.59	0.50	0 – 1	.48
24. Did you "cut back" on the frequency of sexual relations?	0.57	0.50	0 – 1	.40
25 Did you "cut back" on things you usually do with friends?	0.55	0.50	0 – 1	.52
26. Did you cut back on things you usually do with your family?	0.39	0.49	0 – 1	.54
27. Did you "cut back" or quit your job since surgery?	0.04	0.19	0 – 1	.13
28. Did the surgery cause you financial concerns?	0.24	0.43	0 – 1	-.03
29. Did you feel that your partner was over protecting you?	0.37	0.49	0 – 1	.32
30. Did you and your partner disagree about your activity?	0.44	0.50	0 – 1	.18
31. Did your partner worry about your health?	0.95	0.21	0 – 1	.08
32. Did you and your partner get on each others nerves?	0.32	0.47	0 – 1	.32
33. Did you feel like your partner expected too much of you?	0.08	0.27	0 – 1	.08
34. Did you feel "left out" of family decisions?	0.02	0.14	0 – 1	.04

Item Level Descriptive and Psychometric Statistics, Recovery Difficulty

Item	*M*	*SD*	Range	Item-Total Correlation
1. Did you have pain from your chest incision?	1.71	1.49	0 – 5	.35
2. Did you have swelling in your hands and feet?	1.24	1.42	0 – 5	.15
3. Did you have aching in your back or shoulders?	1.35	1.65	0 – 5	.26
4. Did you have the sensation of your heart pounding?	1.70	1.73	0 – 5	.26
5. Did you get short of breath?	1.26	1.50	0 – 5	.34
6. Did you have a change in appetite?	1.52	1.72	0 – 5	.44
7. Did you have angina?	0.27	0.80	0 – 4	.07
8. Did you have a change in your vision?	0.81	1.37	0 – 5	.20
9. Did you have numbness in your hands or fingers?	0.46	1.06	0 – 5	.18
10. Did you have trouble sleeping?	1.84	1.74	0 – 5	.29
11. Did you have trouble with your memory or forgetfulness?	1.00	1.31	0 – 4	.54
12. Did you feel anxious or tense?	1.19	1.44	0 – 4	.44
13. Did you feel sad or depressed?	0.88	1.32	0 – 4	.47
14. Did you have frequent changes in mood?	0.63	1.18	0 – 5	.53
15. Have you been fatigued?	2.11	1.40	0 – 5	.47
16. Have you been hospitalized over night for cardiac problems?	0.65	1.37	0 – 5	.27
17. Have you cut back or tried to quit smoking?	0.04	0.31	0 – 1	-.08
18. Have you tried to reduce the amount of salt you use?	1.81	1.55	0 – 5	.21
19. Have you tried to reduce the amount of fat or cholesterol in your diet?	2.08	1.55	0 – 5	.10
20. Have you been exercising at least three times a week?	2.31	1.38	0 – 5	.15
21. Did you "cut back" on your usual chores (gardening, errands, etc.)?	1.87	1.45	0 – 5	.55

Item Level Descriptive and Psychometric Statistics, Recovery Difficulty

Item	*M*	*SD*	Range	Item-Total Correlation
22. Did you "cut back" on things you usually do with children or grandchildren?	0.76	1.27	0 – 4	.44
23. Did you "cut back" on things you usually do for fun?	1.52	1.54	0 – 5	.66
24. Did you "cut back" on the frequency of sexual relations?	1.48	1.69	0 – 5	.54
25. Did you "cut back" on things you usually do with friends?	1.29	1.51	0 – 5	.69
26. Did you cut back on things you usually do with your family?	0.89	1.38	0 – 5	.64
27. Did you "cut back" or quit your job since surgery?	0.09	0.53	0 – 4	.36
28. Did the surgery cause you financial concerns?	0.64	1.30	0 – 5	.22
29. Did you feel that your partner was over protecting you?	0.91	1.37	0 – 5	.36
30. Did you and your partner disagree about your activity?	1.00	1.26	0 – 5	.42
31. Did your partner worry about your health?	2.92	1.34	0 – 5	.43
32. Did you and your partner get on each others nerves?	0.67	1.11	0 – 5	.49
33. Did you feel like your partner expected too much of you?	0.20	0.71	0 – 4	.27
34. Did you feel "left out" of family decisions?	0.10	0.56	0 – 5	.27
35. Overall, how hard was recovey for you?	2.27	1.13	1 – 5*	.62

*** Item to scale not computed due to zero variance.

* Possible range of scores = 1 to 5.

Item Level Descriptive and Psychometric Statistics, Recovering Individual Satisfaction

Item	*M*	*SD*	Range	Item-Total Correlation
Overall, how satisfied are you ...				
1. With your physical progress in recovery?	4.27	1.07	1 – 5	.37
2. With your ability to do the things you really want to do?	3.69	1.21	1 – 5	.44
3. With recovery in your thoughts and feelings?	4.21	1.04	1 – 5	.69
4. With the physical help provided to you by your partner?	4.75	0.72	1 – 5	.46
5. With the affection expressed to you by your partner?	4.82	0.60	1 – 5	.47
6. With the level of concern expressed by your partner?	4.86	0.49	1 – 5	.64
7. With your partner's willingness to help you?	4.91	0.45	1 – 5	.69
8. That your partner really understood what you were going through?	4.71	0.72	1 – 5	.61
9. With your ability to "follow the doctor's orders" for recovery?	4.56	0.68	1 – 5	.59
10. With your ability to tolerate the discomforts experienced in recovery?	4.35	0.82	1 – 5	.48
11. With the communication between you and your partner during recovery?	4.72	0.66	1 – 5	.63
12. That you have contributed to your partner's happiness despite the limitations imposed by your surgery?	4.23	0.84	1 – 5	.55

Item Level Descriptive and Psychometric Statistics, Caregiving Demands

Item	*M*	*SD*	Range	Item-Total Correlation
1. Did your partner have chest pain that worried you?	0.38	0.49	0 – 1	.39
2. Did your partner have shortness of breath that worried you?	0.37	0.49	0 – 1	.22
3. Did your partner have fatigue that worried you?	0.64	0.48	0 – 1	.52
4. Has your partner experienced mood swings?	0.54	0.50	0 – 1	.60
5. Has your partner been irritable or hard to get along with?	0.38	0.49	0 – 1	.59
6. Has your partner been sad or depressed?	0.46	0.50	0 – 1	.55
7. Has your partner had trouble remembering things?	0.61	0.49	0 – 1	.41
8. Has your partner been confused?	0.36	0.48	0 – 1	.44
9. Did you help your partner to evaluate symptoms?	0.58	0.50	0 – 1	.46
10. Did you call or talk to the doctor for him/her?	0.43	0.50	0 – 1	.35
11. Did you physically help your partner with walking?	0.49	0.50	0 – 1	.44
12. Did you help your partner with bathing?	0.33	0.47	0 – 1	.44
13. Did you help your partner with medications?	0.59	0.49	0 – 1	.20
14. Did you prepare special meals for your partner?	0.68	0.47	0 – 1	.32
15. Did you change your usual meals?	0.39	0.49	0 – 1	.28
16. Did helping your partner interrupt your usual sleep patterns?	0.38	0.49	0 – 1	.38
17. Has your partner tried to do "too much"?	0.53	0.50	0 – 1	.09
18. Has your partner tried to cut back or quit smoking?	0.05	0.21	0 – 1	.19

Item Level Descriptive and Psychometric Statistics, Caregiving Demands

Item	*M*	*SD*	Range	Item-Total Correlation
19. Has your partner chosen not to quit smoking?	0.02	0.14	0 – 1	.09
20. Have you tried to change your own diet?	0.58	0.50	0 – 1	.24
21. Have you tried to exercise with your partner?	0.61	0.49	0 – 1	.30
22. Have you tried to cut back or quit smoking?	0.07	0.25	0 – 1	.16
23. Have you "taken on" responsibilities or chores that your partner would normally do?	0.75	0.44	0 – 1	.45
24. Did you "cut back" on things you usually do with your children or grandchildren?	0.23	0.42	0 – 1	.32
25. Did you "cut back" on the things you do for fun?	0.48	0.50	0 – 1	.42
26. Did you "cut back on things you usually do with friends?	0.48	0.50	0 – 1	.37
27. Did you take time off or quit your job to help your partner in recovery?	0.11	0.32	0 – 1	.10
28. Did the surgery cause you financial concerns?	0.21	0.41	0 – 1	.26
29. Did you and your partner disagree about his/her activity?	0.30	0.46	0 – 1	.29
30. Did you and your partner get on each others nerves?	0.39	0.49	0 – 1	.52
31. Did you and your partner "cut back" on the frequency of sexual relations?	0.39	0.49	0 –1	.32
32. Did you try to protect your partner from family problems?	0.37	0.49	0 – 1	.45

Item Level Descriptive and Psychometric Statistics, Caregiving Difficulty

Item	*M*	*SD*	Range	Item-Total Correlation
1. Did your partner have chest pain that worried you?	1.17	1.73	0 – 5	.47
2. Did your partner have shortness of breath that worried you?	1.11	1.62	0 – 5	.36
3. Did your partner have fatigue that worried you?	2.01	1.81	0 – 5	.63
4. Has your partner experienced mood swings?	1.41	1.56	0 – 5	.65
5. Has your partner been irritable or hard to get along with?	1.00	1.45	0 – 5	.55
6. Has your partner been sad or depressed?	1.32	1.60	0 – 5	.49
7. Has your partner had trouble remembering things?	1.44	1.41	0 – 5	.47
8. Has your partner been confused?	0.84	1.34	0 – 5	.49
9. Did you help your partner to evaluate symptoms?	1.31	1.47	0 – 5	.48
10. Did you call or talk to the doctor for him/her?	0.80	1.27	0 – 5	.47
11. Did you physically help your partner with walking?	0.77	1.11	0 – 4	.66
12. Did you help your partner with bathing?	0.51	0.97	0 – 5	.59
13. Did you help your partner with medications?	0.98	1.20	0 – 5	.48
14. Did you prepare special meals for your partner?	1.05	1.13	0 – 5	.35
15. Did you change your usual meals?	0.66	1.07	0 – 5	.29
16. Did helping your partner interrupt your usual sleep patterns?	0.84	1.34	0 – 5	.51
17. Has your partner tried to do "too much"?	1.30	1.39	0 – 4	.21
18. Has your partner tried to cut back or quit smoking?	0.05	0.49	0 – 5	.23

Item Level Descriptive and Psychometric Statistics, Caregiving Difficulty

Item	*M*	*SD*	Range	Item-Total Correlation
19. Has your partner chosen not to quit smoking?	0.00	0.00	000	***
20. Have you tried to change your own diet?	1.28	1.48	0 – 5	.27
21. Have you tried to exercise with your partner?	1.17	1.35	0 – 4	.43
22. Have you tried to cut back or quit smoking?	0.26	1.04	0 – 5	.13
23. Have you "taken on" responsibilities or chores that your partner would normally do?	1.71	1.43	0 – 5	.62
24. Did you "cut back" on things you usually do with your children or grandchildren?	0.35	0.76	0 – 3	.37
25. Did you "cut back" on the things you do for fun?	1.01	1.31	0 – 5	.52
26. Did you "cut back on things you usually do with friends?	0.87	1.16	0 – 5	.54
27. Did you take time off or quit your job to help your partner in recovery?	0.18	0.60	0 – 4	.31
28. Did the surgery cause you financial concerns?	0.55	1.22	0 – 5	.10
29. Did you and your partner disagree about his/her activity?	0.64	1.15	0 – 4	.47
30. Did you and your partner get on each others nerves?	0.96	1.41	0 – 5	.53
31. Did you and your partner "cut back" on the frequency of sexual relations?	0.78	1.28	0 – 5	.46
32. Did you try to protect your partner from family problems?	0.70	1.13	0 – 5	.48
33. Overall, how hard has recovery been for you?	2.27	1.14	0 – 5	.64

*** Item to scale correlation not computed due to zero variance.

Item Level Descriptive and Psychometric Statistics, Caregiving Satisfaction

Item	*M*	*SD*	Range	Item-Total Correlation
Overall, how satisfied are you...				
1. With your partner's physical progress in recovery?	4.26	1.17	1 – 5	.52
2. With your partner's recovery in his or her thoughts and feelings?	4.26	0.98	1 – 5	.67
3. With your partner's efforts to follow the "doctor's orders" for recovery?	4.52	0.81	1 – 5	.71
4. With your partner's ability to follow the "doctor's orders" for recovery?	4.67	0.81	1 – 5	.75
5. With the appreciation expressed by your partner for your help?	4.48	0.94	1 – 5	.77
6. With the affection expressed to you by your partner?	4.52	0.90	1 – 5	.76
7. With your partner's willingness to let you help?	4.34	0.94	1 – 5	.77
8. With your own ability to help him or her?	4.18	0.98	1 – 5	.71
9. With your own strength in providing care or helping your partner?	4.19	1.02	1 – 5	.58
10. With the communication between you and your partner during convalescence?	4.42	0.99	1 – 5	.76
11. That you really understood what your partner was going through?	4.38	0.84	1 – 5	.64
12. That you have contributed to your partner's progress in recovery?	4.45	0.84	1 – 5	.66

Appendix F

Zero-Order Correlation Matrix for Predictor and Outcome Variables

Zero-Order Correlation Coefficients for Predictor and Outcome Variables

		RI Age	RI Gender	Illness Severity	RI Optimism	Residual Optimism	RI Mutuality	CG Mutuality	CG Age	CG Gender	CG Health	CG Emotional Distress, T1	CG Optimism
RI Age	*r*	—	-.04	.19	.04	.08	-.06	-.06	.51	.04	-.09	.11	-.01
	p		.69	.06	.71	.42	.54	.57	.00	.69	.35	.28	.89
	n		107	106	105	103	107	107	107	107	107	98	106
RI Gender	*r*		—	-.23	-.15	.10	.01	.04	-.27	-1.00	.03	-.02	.14
	p			.02	.14	.33	.90	.72	.01		.74	.84	.16
	n			106	105	103	107	107	107	107	107	98	106
Illness Severity	*r*			—	-.14	-.21	-.01	.02	.28	.23	-.09	.10	.01
	p				.16	.03	.90	.87	.01	.02	.36	.35	.95
	n				104	103	107	106	106	107	106	97	106
RI Optimism	*r*				—	.00	.16	.19	.07	.15	.09	-.12	.07
	p						.11	.05	.48	.14	.36	.24	.48
	n					103	105	105	105	105	105	96	104
Residual Optimisim	*r*					—	.08	.09	-.03	-.09	.07	.05	.10
	p						.43	.35	.77	.35	.50	.66	.30
	n						103	103	103	103	103	94	103
RI Mutuality	*r*						—	.58	.04	-.01	.07	-.23	.29
	p							.00	.67	.90	.48	.02	.01
	n							107	107	107	107	98	106
CG Mutuality	*r*							—	-.01	-.04	.05	-.13	.34
	p								.94	.72	.61	.21	.00
	n								107	107	107	98	106
CG Age	*r*								—	.27	-.14	-.09	-.07
	p									.01	.14	.37	.48
	n									107	107	98	106
CG Gender	*r*									—	-.03	.02	-.14
	p										.74	.84	.16
	n										107	98	106
CG Health	*r*										—	-.23	.36
	p											.02	.00
	n											98	106
CG Emotional Distress at Discharge	*r*											—	-.34
	p												.01
	n												97
CG Optimism	*r*												—
	p												
	n												

Zero-Order Correlation Coefficients for Predictor and Outcome Variables

		RI Demands	RI Difficulty	RI Satisfaction	RI Efficacy	CG Demands	CG Difficulty	CG Satisfaction	CG Efficacy	RI Activity at 3 months	RI Emotional Distress, 3 months	CG Emotional Distress, 3 months
RI Age	*r*	.11	.11	-.05	-.06	.09	.06	-.07	.02	-.20	.06	.13
	p	.24	.28	.64	.57	.36	.54	.48	.82	.04	.57	.20
	n	107	105	107	106	107	99	106	101	106	103	104
RI Gender	*r*	-.09	-.16	.09	.27	-.31	-.33	-.02	.10	.22	-.01	-.18
	p	.37	.11	.36	.01	.01	.01	.82	.34	.03	.89	.07
	n	107	105	107	106	107	99	106	101	106	104	104
Illness Severity	*r*	.29	.25	-.32	-.15	.30	.29	.08	-.20	-.55	.24	.21
	p	.01	.01	.01	.12	.01	.01	.44	.05	.00	.02	.03
	n	106	104	106	105	106	98	105	100	106	103	103
RI Optimism	*r*	-.13	-.12	.16	.07	-.13	-.15	.07	-.02	.08	-.30	-.12
	p	.19	.22	.11	.51	.18	.14	.48	.82	.45	.01	.25
	n	105	103	105	105	105	97	104	99	104	103	102
RI Mutuality	*r*	-.18	-.07	.17	.09	-.14	-.16	.23	.06	-.01	-.24	-.36
	p	.07	.51	.08	.35	.14	.11	.02	.56	.92	.01	.00
	n	107	105	107	106	107	99	106	101	106	104	104
CG Mutuality	*r*	-.18	-.11	.17	.15	-.28	-.28	.31	.02	.05	-.27	-.42
	p	.07	.28	.08	.13	.01	.01	.01	.87	.62	.01	.00
	n	107	105	107	106	107	99	106	101	106	104	104
CG Age	*r*	.02	.03	-.08	-.03	.02	-.01	.13	-.17	-.13	.08	.09
	p	.87	.78	.44	.78	.86	.92	.19	.09	.19	.42	.35
	n	107	105	107	106	107	99	106	101	106	104	104
CG Gender	*r*	.09	.16	-.09	-.27	.31	.33	.02	-.10	-.22	.01	.18
	p	.37	.11	.36	.01	.01	.01	.82	.34	.03	.89	.07
	n	107	105	107	106	107	99	106	101	106	104	104
CG Health	*r*	.01	-.02	-.02	.19	-.02	-.12	.03	-.03	-.07	.02	-.39
	p	.89	.87	.86	.05	.81	.23	.77	.79	.47	.84	.00
	n	107	105	107	106	107	99	106	101	106	104	104
CG Emotional Distress at Discharge	*r*	.22	.18	-.11	-.02	.30	.38	-.23	.05	-.13	.08	.39
	p	.03	.08	.27	.82	.01	.00	.03	.64	.20	.46	.00
	n	98	96	98	97	98	92	97	97	97	96	95
CG Optimism	*r*	-.12	-.16	.18	.27	-.21	-.28	.11	-.01	.05	-.22	-.47
	p	.22	.11	.06	.01	.03	.01	.25	.93	.58	.03	.00
	n	106	104	106	106	106	98	105	100	106	103	103

Zero-Order Correlation Coefficients for Predictor and Outcome Variables

		RI Demands	RI Difficulty	RI Satisfaction	RI Efficacy	CG Demands	CG Difficulty	CG Satisfaction	CG Efficacy	RI Activity	RI Total Mood Disturbance	CG Total Mood Disturbance
RI Demands	*r*	—	.85	-.40	-.22	.42	.46	-.18	-.10	-.31	.45	.12
	p		.00	.00	.03	.00	.00	.06	.32	.01	.00	.23
	n		105	107	106	107	99	106	101	106	104	104
RI Difficulty	*r*		—	-.35	-.33	.41	.49	-.16	-.09	-.34	.46	.12
	p			.00	.01	.00	.00	.11	.39	.00	.00	.23
	n			105	104	105	97	104	99	104	102	105
RI Satisfaction	*r*			—	-.01	-.33	-.41	.18	.11	.34	-.49	-.25
	p				.94	.01	.00	.07	.26	.00	.00	.01
	n				106	107	99	106	101	106	104	104
RI Efficacy	*r*				—	-.24	-.29	-.03	.19	.16	-.14	-.29
	p					.01	.01	.76	.06	.11	.17	.01
	n					106	98	105	100	105	104	103
CG Demands	*r*					—	.91	-.13	-.12	-.43	.24	.45
	p						.00	.20	.23	.00	.01	.00
	n						99	106	101	106	104	96
CG Difficulty	*r*						—	-.22	-.09	-.39	.32	.45
	p							.03	.42	.00	.01	.00
	n							98	94	98	97	104
CG Satisfaction	*r*							—	.11	.08	-.19	-.25
	p								.28	.44	.05	.01
	n								100	109	103	103
CG Efficacy	*r*								—	.20	-.05	-.03
	p									.04	.64	.73
	n									100	98	98
RI Activity, 3 Month	*r*									—	-.29	-.19
	p										.01	.05
	n										103	103
RI Emotional Distress,3 Months	*r*										—	.06
	p											.52
	n											101
CG Emotional Distress,3 Months	*r*											—
	p											
	n											