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**Determinants of Psychological and Social Adjustment
Among Cardiac Rehabilitation Patients: Personal Resources,
Stress, and Coping Strategies.**

Andrée M. Cazabon

**Dissertation submitted to the School of Graduate Studies
University of Ottawa in partial fulfilment
of the requirements for the Ph.D. degree
in Clinical Psychology**



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*In memory of my sister Lyne R. Cazabon
(1962 - 1988).*

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Determinants of Psychological and Social Adjustment
Among Cardiac Rehabilitation Patients: Personal Resources,
Stress, and Coping Strategies.

ABSTRACT

During the process of their rehabilitation, patients with coronary heart disease (CHD) are confronted with numerous adjustive demands. Regaining optimal functional capacity is believed to involve complex interactions between physical, psychological, and social sequelae, and the strategies used to cope with them. Relatively little is known about the nature of the stressors faced by CHD patients and their relationship to coping with and adjustment to heart disease. Consequently, the primary objectives of this study were: to determine the predictors of psychological distress and social maladjustment (i.e., social interaction, work, and home management functioning), to determine the relationship between specific coping strategies and psychological distress and social maladjustment, and to determine the effects of program participation on patients' level of personal mastery, cardiac functional capacity, frequency of stressors, and coping strategies. Coping was defined using the stress and coping models of Lazarus and Folkman (1984) and Tobin, Holroyd, Reynolds, and Wigal (1989).

This study employed a prospective design to assess the relationships among patients' level of psychological distress, social maladjustment, personal mastery, cardiac

functional capacity, stress (i.e., hassles), and coping strategies at the time of their intake into a multidisciplinary rehabilitation program and again at three and six months later. The sample comprised 223 males between the ages of 27 and 66 who had heterogeneous CHD diagnoses. The data were collected by means of standardized questionnaires using a mailing procedure which achieved a response rate of approximately 90% across time points.

The results of multiple hierarchical regression analyses revealed that number of hassles and disengagement coping contributed significant increments to the variance explained in psychological distress. Higher levels of engagement and symptom management coping, however, were not found to be significant predictors of lower psychological distress in this study. For social maladjustment, in general, neither stress nor coping emerged as consistent predictors of social maladjustment across time points. Coping consistently emerged as a stronger predictor of both psychological distress and social maladjustment when current coping strategies were used as predictors (*Model B*), as opposed to when coping strategies from the previous time point were entered (*Model A*). Regarding the relationships among specific coping strategies and psychological distress and social maladjustment, the disengagement coping strategies had stronger positive correlations with psychological distress and one of the three social maladjustment outcomes than did engagement coping, which had fewer and weaker positive correlations with these outcomes. Program participation did not predict personal mastery or use of coping strategies, but did predict fewer hassles. The number of physiotherapy sessions received predicted level of cardiac functional capacity. Furthermore, greater cardiac

functional capacity was predicted by higher personal mastery, fewer hassles, lower psychological distress, and less impairment in domestic activity.

This study demonstrates the importance of psychosocial variables as predictors of cardiac functional capacity, and provides empirical evidence that these variables moderate the relationship between physical status and recovery level. The findings concerning the identification of predictors of adjustment provide useful information for developing rehabilitation interventions for CHD patients. Patients' adjustment may be facilitated by reduction of hassles, limiting use of disengagement coping strategies, and strengthening personal mastery. The methodological strengths and weaknesses of this study are discussed, as are its implications for coping theory and research.

TABLE OF CONTENTS

Dedication	ii
Acknowledgements	iii
Abstract	iv
List of Figures	xiv
List of Tables	xv
1. INTRODUCTION	1
2. REVIEW OF THE LITERATURE	3
2.1 Physical, Psychological, and Social Adjustment to Heart Disease	3
2.1.1 Physical cardiac adjustment	3
2.1.2 Psychological adjustment	5
2.1.3 Social adjustment	8
2.2 Determinants of Adjustment to Chronic Illness Including Heart Disease	14
2.2.1 Stress	15
2.2.2 The Adjustive Demands and Stressors Imposed by Chronic Illness Including Heart Disease	17
2.2.3 Personal Mastery - A Psychological Resource	19
2.2.4 Coping Models and Definitions	20
2.3 Conclusion and Rationale	47
3. OBJECTIVES, HYPOTHESES, AND RESEARCH QUESTIONS	50
3.1 Objective 1: Stability of Key Dependent and Independent Variables	50
3.2 Objective 2: Prediction of Outcomes - Psychological Distress and Social Maladjustment	51
3.3 Objective 3: Relationship Between Specific Coping Strategies and Outcome Variables	54

3.4	Objective 4: Description of Stressors (Hassles)	54
3.5	Objective 5: Description of Coping Strategies	55
3.6	Objective 6: Effects of Program Participation on Personal Mastery, Kilocalorie Expenditure, Number of Hassles, and Coping Variables ..	55
4.	METHODOLOGY	57
4.1	Subjects and Sample	57
4.1.1	Research Setting	57
4.1.2	Research Sample	58
4.2	Procedure	59
4.3	Variables and Measures	63
4.3.1	Cardiac Functional Capacity	63
4.3.2	Personal Mastery	64
4.3.3	Stress	65
4.3.4	Focal Stressors and Cognitive Appraisals	67
4.3.5	Coping Strategies	68
4.3.6	Psychological Distress	70
4.3.7	Social Maladjustment	71
5.	RESULTS	73
5.1	Pre-analysis Comparisons	73
5.1.1	Comparing drop-outs and participants	73
5.1.2	Comparing employed dropouts and employed participants	76
5.2	Objective 1: Stability of Key Dependent and Independent Variables	80
5.2.1	Research Question 1: Mean differences across time points among the variables	80
5.3	Objective 2: Prediction of Psychological Distress and Social Maladjustment Outcomes	89
5.3.1	Correlations Among Outcome Variables	94
5.3.2	Hypothesis 1: Prediction of psychological distress	97
5.3.3	Hypothesis 2: Prediction of Social Maladjustment	101
5.4	Objective 3: Relationship Between Coping Strategies and Outcome Variables	111

5.4.1	Research Question 2: Correlations between Coping Strategies Inventory, Symptom Management Scale, psychological distress, and social maladjustment at the 3 time points	111
5.5	Objective 4: Description of Hassles	117
5.5.1	Research Question 3: Frequency, severity and intensity of stressors at the 3 time points	117
5.6	Objective 5: Description of Coping Strategies	118
5.6.1	Research Question 4: Description across time points of the focal stressors identified, the coping strategies used, and their relationship to each other	118
5.7	Objective 6: Effects of Participation in the Cardiac Rehabilitation Program on Personal Mastery, Kilocalorie Expenditure, Number of Hassles, and Coping Variables	126
5.7.1	Research Question 5: Prediction of personal mastery	127
5.7.2	Research Question 5: Prediction of kilocalorie expenditure	129
5.7.3	Research Question 5: Prediction of number of hassles	131
5.7.4	Research Question 5: Prediction of coping strategies	134
6.	DISCUSSION	138
6.1	Hypotheses	138
6.1.1	Hypothesis 1: Prediction of psychological distress	138
6.1.2	Hypothesis 2: Predicting social maladjustment	143
6.2	Research Questions	147
6.2.1	Research question 1: Mean differences across time points among the variables	147
6.2.2	Research question 2: Correlations between the Coping Strategies Inventory, Symptom Management Scale, psychological distress, and social maladjustment at the 3 time points	150
6.2.3	Research question 3: Frequency, severity and intensity of stressors at the three time points	153
6.2.4	Research question 4: Description across time points of the focal stressors identified, the coping strategies used, and their relationship to each other	153
6.2.5	Research question 5: Prediction of possible mediator variables	155

6.3	Strengths, Limitations, Research and Clinical Implications of the Study	158
6.3.1	Strengths	158
6.3.2	Limitations	159
6.3.3	Research Implications	161
6.3.4	Clinical implications	163
7.	REFERENCES	165
	APPENDICES	180
	Appendix A:	
	A-1 Patient Informed Consent Form	181
	A-2 Spouse Informed Consent Form	182
	Appendix B:	
	B-1 Personal Information Sheet - Intake	183
	B-2 Personal Information Sheet - 3 Months	185
	B-3 Personal Information Sheet - 6 Months	188
	B-4 Personal Mastery Questionnaire	191
	B-5 Hassles and Concerns Scale	192
	B-6 Stress Questionnaire	197
	B-7 Symptom Management Scale	203
	B-8 Brief Symptom Inventory (BSI)	204
	B-9 Patient Sickness Impact Profile (SIP)	205
	B-10 Spouse Sickness Impact Profile (SIP-S)	208
	Appendix C:	
	Table C-1 Response Rates for Questionnaires at the Three Times Points	211
	Appendix D: Purging of Confounded Items	212
	Appendix E: Internal Consistency of Scales	214
	Table E-1 Internal Consistency (Cronbach's Coefficient Alpha or Kuder-Richardson 20) of Each Scale Before and After Item Purging	215
	Table E-2 Internal Consistency (Cronbach's Coefficient Alpha or Kuder-Richardson 20) of Each Scale at the Three Time Points	216

Appendix F: Intraclass Correlation Between Patients' and Spouses' Sickness Impact Profile (SIP)	217
Appendix G: Factor Structure of the Coping Strategies Inventory (CSI)	218
Table G-1 Principal Component Analysis of the Coping Strategies Inventory (CSI)	219
Appendix H: Intercorrelation Between the Coping Strategies Inventory (CSI) and Symptom Management Scales (SMS)	220
Table H-1 Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 1	221
Table H-2 Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 2	222
Table H-3 Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 3	223
Appendix I: Evaluation of Assumptions, Multicollinearity, Outliers, and Influential Data Points for the Hierarchical Multiple Regression Models	224
1. Evaluation of assumptions for the regression models: Normality, linearity, and homoscedasticity	224
2. Multicollinearity	227
3. Outliers and Influential Data Points	228
Appendix J:	
Table J-1 Frequency of Respondents and Non-respondents to the Coping Strategies Inventory (CSI) for Regression Models A and B	232
Appendix K:	233
Table K-1 Hierarchical Multiple Regression of Psychological Distress (BSI score; Time 2) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B)	233

Table K-2 Hierarchical Multiple Regression of Psychological Distress (BSI score; Time 3) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B)	234
--	-----

Appendix L:

Table L-1 Hierarchical Multiple Regression of Home Management Activity (SIP-HM score; Time 2) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B)	235
---	-----

Table L-2 Hierarchical Multiple Regression of Home Management Activity (SIP-HM score; Time 3) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B)	236
---	-----

Appendix M:

Table M-1 Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 2) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B)	237
---	-----

Table M-2 Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 3) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B)	238
---	-----

Appendix N:

Table N-1 Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 2) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B)	239
---	-----

Table N-2 Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 3) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B)	240
---	-----

Appendix O:	
Table O-1 Zero-order Correlations Between the Predictor Variables at the Three Time Points	241
Curriculum Vitae	242

LIST OF FIGURES

Figure 1	Hierarchical Factor Structure of the Coping Strategies Inventory (CSI)	34
Figure 2	Mean Personal Mastery Scores	82
Figure 3	Mean Kilocalorie Expenditure	83
Figure 4	Mean Number of Hassles	84
Figure 5	Mean Engagement and Disengagement Coping Scores	85
Figure 6	Mean Symptom Management Scores	86
Figure 7	Mean Psychological Scores	87
Figure 8	Mean Sickness Impact Profile Scores	88
Figure 9	Hierarchical Multiple Regression Models for Analyses	91

LIST OF TABLES

Table 1	Descriptive Data and Significance Tests Comparing Drop-outs and Participants at the Three Time Points	74
Table 2	Descriptive Data and Significance Tests on Time 1 Demographic Variables for Dropouts and Participants at the Three Time Points	75
Table 3	Descriptive Data and Significance Tests Comparing Employed Drop-outs and Employed Participants at Times 2 and 3	78
Table 4	Descriptive Data and Significance Tests for Time 1 Demographic Variables for Employed Dropouts and Employed Participants at Times 2 and 3	79
Table 5	Stability of Key Dependent and Independent Variables over Time	81
Table 6	Zero-order Correlations Between Outcome Variables at the Three Time Points	95
Table 7	Zero-order Correlations Between Predictor Variables and Outcome Measures at the Three Time Points	96
Table 8	Hierarchical Multiple Regression of Psychological Distress (BSI score; Time 3) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B)	98
Table 9	Summary Table of Hierarchical Multiple Regression of Psychological Distress (BSI Score) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points	100
Table 10	Hierarchical Multiple Regression of Home Management Activity (SIP-HM score; Time 3) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B) . . .	102

Table 11	Summary Table of Hierarchical Multiple Regression of Home Management Activity (SIP-HM Score) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points	104
Table 12	Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 3) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B) . . .	105
Table 13	Summary Table of Hierarchical Multiple Regression of Social Interaction (SIP-SI Score) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points	107
Table 14	Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 3) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B)	108
Table 15	Summary Table of Hierarchical Multiple Regression of Work Functioning (SIP-Work Score) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points	110
Table 16	Zero-order Correlations Between Coping Strategies at Time 1 and Outcomes at Three Time Points	112
Table 17	Zero-order Correlations Between Coping Strategies at Time 2 and Outcomes at Time 2 and 3	113
Table 18	Zero-order Correlations Between Coping Strategies at Time 3 and Outcomes at Time 3	114
Table 19	Changes in Mean Hassle Frequency, Severity, and Intensity cores over Time	119
Table 20	Frequencies of Cardiac and Non-cardiac Focal Stressors at the Three Time Points	121

Table 21	Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 1	122
Table 22	Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 2	123
Table 23	Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 3	124
Table 24	Hierarchical Multiple Regression of Personal Mastery (Time 3) on Personal Mastery, Demographic Variables, Kilocalorie Expenditure, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3)	128
Table 25	Hierarchical Multiple Regression of Kilocalorie Expenditure (Time 3) on Kilocalorie Expenditure, Demographic Variables, Personal Mastery, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3)	130
Table 26	Hierarchical Multiple Regression of Kilocalorie Expenditure (Time 3) on Kilocalorie Expenditure, Demographic Variables, Personal Mastery, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Physiotherapy (Time 3)	132
Table 27	Hierarchical Multiple Regression of Number of Hassles (Time 3) on Number of Hassles, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3)	133
Table 28	Hierarchical Multiple Regression of Engagement Coping (Time 3) on Engagement Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3)	135
Table 29	Hierarchical Multiple Regression of Disengagement Coping (Time 3) on Disengagement Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3)	136
Table 30	Hierarchical Multiple Regression of Symptom Management Coping (Time 3) on Symptom Management Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3)	137

1. INTRODUCTION

Coronary heart disease (CHD) accounts for 30% of all deaths among Canadians (Statistics Canada, 1988). For males aged 40 years of age and older CHD accounts for 28% of all deaths (Health & Welfare Canada, 1987). Between the ages of 25 and 74, CHD mortality rate for males is almost 3 times that for females. Furthermore, age standardized rates of acute myocardial infarction (MI) for the same age group are 2.5 times greater for males than females (Health and Welfare Canada, 1986). Mortality rates due to heart disease have declined in the last 15 years, however it remains as the leading cause of premature deaths for both males and females. The direct costs associated with CHD stem from hospitalization for myocardial infarction (MI), unstable angina, coronary angiography, coronary artery bypass surgery (CABS), chronic heart failure due to CHD, angioplasty, etc. In addition to the considerable burden placed on the health care system by CHD, its indirect social costs to Canada have been estimated to be \$6 billion a year (Toronto Working Group on Cholesterol Policy, 1989).

Refinements in medical and surgical procedures have led to an increased number of patients surviving CHD (Krantz & Deckel, 1983). Canadian hospitalization discharge rates for acute MI are 270 per 100,000 for males and 103 per 100,000 for females (Health and Welfare Canada, 1986). Recovery from MI and CABS requires complex psychological and behavioural adjustments in addition to physical recovery. The fact that

many cardiac patients have significant psychosocial concerns has been well documented (Hackett & Cassem, 1974; Doehrman, 1977; Croog, 1983). These patients face a variety of stressors, including the impact of the disease itself, changes in physical functional capacity, unpredictability and uncertainty regarding the course of illness, distressing emotional reactions such as depression and anxiety, threats to self-esteem and self-image, discomfort in social relationships, changes in marital and social roles, and the disruption of life plans. Stressors such as these have been consistently correlated with impaired adjustment (Krantz & Deckel, 1983; Doehrman, 1977; Waltz, 1986). Although cardiac patients must cope with long-term adjustive demands, our present understanding of the nature of these demands, the strategies used to cope with them, and the relationship between coping and both psychosocial and physical health outcomes is limited.

2. REVIEW OF THE LITERATURE

2.1 Physical, Psychological, and Social Adjustment to Heart Disease

Many variables have been considered as indicators of post-cardiac adjustment. In addition to physical health variables (e.g., amount of damaged tissue, intensity of symptoms, physical activity level, side effects of medication), psychological variables (e.g., distress, morale, perceptions of illness), and social variables (e.g., resumption of normal activities) have received attention (Doehrman, 1977; Krantz & Deckel, 1983; Rejeski, Morley & Sotile, 1985).

2.1.1 Physical cardiac adjustment

The physiological consequences of cardiac disease can include any number of sequelae, including damage to the myocardium resulting in decreased oxygen supply, disorders of heart rhythm, dyspnea, reduced stamina or weakness, and angina (Rejeski et al., 1985; Wishnie, Hackett, & Cassem, 1971; Davidson, 1979). Taken together, these problems impose limits on physical functional capacity and activity level. At 6 months post-MI, as many as 42% of patients may report chest pain, breathlessness, and fatigue (Trelawny-Ross & Russell, 1987). Angina is reported by between 15% and 44% of CABS patients 6 and 12 months post-operatively, whereas up to 18% of patients experience dyspnea 6 months post-operatively (Langeluddecke, Fulcher, Baird, Hughes, & Tennant,

1989; Horgan, Davies, Hunt, Westlake & Mullerworth, 1984; Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983). These symptoms however, are experienced by only 10% of those who survive 3 years or more (Zyzanski, Stanton, Jenkins, & Klein, 1981).

CABS patients who experienced intense chest pain or angina post-operatively have poorer levels of psychosocial functioning (as measured by emotional status and social adjustment) and experience more fears than those who are less symptomatic (Zyzanski, et al., 1981; Stanton, Jenkins, Savageau, Harken, & Aucoin, 1984). Among MI patients, higher levels of physical symptoms and disability are associated with greater negative affect (Waltz, 1986). The patient's psychological response to physical symptoms may trigger alterations in blood pressure, heart rhythm, catecholamines, or cholesterol levels, which may increase risk for further morbidity or mortality (Croog, 1983).

Patients who are asymptomatic and who have an uncomplicated medical status normally begin to resume regular activities after 6 weeks of convalescence (Friedberg, 1966) and report gains in stamina and endurance post-operatively (Jenkins et al., 1983; Barboriak, Anderson, & Rimm, 1983). However, despite reports of improved physical condition after surgery, a significant proportion of patients experience psychosocial difficulties and are reluctant to resume previous activities (Wiklund, Sanne, Vedin, & Wilhelmsson, 1984a). Post-surgical physical improvement has not been directly or strongly associated with psychosocial adjustment (Magni et al., 1987), and the severity of heart disease has not emerged as a strong predictor of psychological distress or social adjustment (Bruce, Bruce, Hossack, & Kusumi, 1983-84; Trelawny-Ross et al., 1987;

Wiklund, Sanne, Elnifeldt, Vedin, & Wilhelmsson, 1984a). For example, lower functional capacity has predicted poorer vocational adjustment in some studies but not in others (Wiklund, Sanne, Vedin, & Wilhelmsson, 1984b; Ruskin et al., 1970; Garrity, 1973). However, perception of health status has generally been found to predict psychological adjustment. Apparently, a positive view of one's health leads to more adaptive levels of mood and behaviour, resulting in more rapid and effective resumption of life activities (Doehrman, 1977; Garrity, 1973; Waltz, 1986; Rejeski et al., 1985).

The severity of myocardial damage and general health only partially predict patients' level of functional capacity one year post-infarct or surgery (Croog, Levine & Lurie, 1968). One limitation of physiological sequelae as predictors of outcome is that patients with the same degree of physical impairment achieve different levels of physical recovery and adjustment. Several psychosocial variables, such as the presence of psychological distress, poor morale, negative expectations for recovery, as well as impaired functioning in interpersonal, vocational, and social roles, appear to moderate the relationship between physical status and recovery level (Croog et al., 1968; Doerhman, 1977; Krantz & Deckel, 1983; Rejeski et al., 1985).

2.1.2 Psychological adjustment

A heart attack is appraised by the patient as an immediate and severe threat to life (Croog et al., 1968), whereas surgery frequently represents a "new lease on life", despite the operative risks involved and the threat of future morbidity. Yet, regardless

of the type of cardiac event they have survived, many patients experience significant levels of psychological distress. Studies examining psychological reactions of cardiac patients following discharge reveal that symptoms of anxiety and depression may persist from a few months to several years (Wishnie et al., 1971; Doehrman, 1977; Mayou Foster & Williamson, 1978; Ruskin et al., 1970; Mayou & Bryant, 1987). Furthermore, the severity of psychological distress among cardiac patients is higher post-discharge than during the hospital stay (Doehrman, 1977) and it has been associated with poorer health and general adjustment outcomes (Krantz & Deckel, 1983; Heller, Frank, Kornfeld, Malm, & Bowman, 1974). Up to 26% of MI patients experience depression 6 months after discharge and upwards of 31% manifest clinically significant levels of anxiety (Doehrman, 1977; Trewlawny-Ross & Russell, 1987; Runions, 1985; Mayou et al., 1978). Others have found that 15% of MI patients continue to report significant depression and anxiety at 1 year post-MI (Stern, Pascale, & Ackerman, 1977). Between 20% and 26% of CABS patients report depression 6 months post-surgery, whereas 22% to 33% remain depressed 12 months post-operatively, and between 18% and 33% experience anxiety 6 and 12 months post-operatively, respectively (Langeluddecke et al., 1989; Allen, 1990; Magni, et al., 1987; Horgan et al., 1984; Heller et al., 1974). Patients frequently report irritability, lack of fulfilment in life, inability to do things as in the past, a sense of uselessness, decreased libido, and general somatic complaints (Stern et al., 1977). These symptom patterns may be related to threatened invalidism, loss of autonomy and independence, reduced initiative and self-esteem, or perceived loss of worth to others

(Hackett & Cassem, 1975; Davidson, 1979; Stern et al., 1977; Waltz, 1986; Doehrman, 1977). Compromised physical status and the experience of weakness or exhaustion with minimal effort may also contribute to depression (Hackett & Cassem, 1975).

Persistent psychological distress can complicate convalescence. CABS patients who felt that their emotional recovery had not progressed as they had expected were more fearful and limited their activities more than those reporting better levels of emotional recovery (Stanton et al., 1984). Some develop "cardiac invalidism", which is characterized by excessive dependency, helplessness, and restricted physical activity. Restricted physical activity results in deconditioning, which can further contribute to a decline in medical status (Krantz, 1980; Krantz & Deckel, 1983).

Rejeski et al. (1985) found that the age of the MI patient influences distress. Young adult patients (aged 18-35) experience distress associated with the fear that they will not be able to establish financial independence from the extended family. Middle-aged patients (aged 36-55) may be concerned about finishing life tasks and fulfilling roles as wage earner, spouse and parent. The older MI patient is concerned with reviewing and integrating his/her life experiences and tends to exhibit less distress than younger patients. Folks, Blake, Fleece, Sokol, and Freeman (1986) also found that older CABS patients were less distressed than younger CABS patients 6 months post-operatively.

Psychological distress has far-reaching implications for recovery, given the potential for disruption of physical, social, and occupational functioning (Wishnie et al.,

1971). Depressed patients, compared to non-depressed patients, may be less likely to return to work, report poorer sexual adjustment, have higher stress levels, and have higher readmission rates for cardiac symptoms (Stern et al., 1977). Those who continue to experience anxiety 6 months post-MI had more marital adjustment difficulties than non-anxious patients, tended to be more obsessive more about their illness, and found it more difficult to derive pleasure from their work, family, or leisure activities (Stern et al., 1977). In a study examining health behaviour change, depressed patients were less likely to continue in exercise and weight loss regimens than were non-depressed patients (Finnegan & Suler, 1984). Adjustment is influenced by the patient's psychological response to real and symbolic threats associated with the illness. The patient must learn how to control his/her anxiety in order to meet the tasks of adjustment (Mechanic, 1977).

Discrepant results regarding the prevalence of distress among studies of cardiac patients may be due to differences in measures used and/or differences in characteristics of the samples studied. Although rates vary between studies, both the prevalence of psychological distress and its implications for recovery and rehabilitation are cause for concern.

2.1.3 Social adjustment

Impaired physical and emotional functioning associated with heart disease can undermine the patient's interpersonal relationships and participation in social activities (Wiklund et al., 1984a; Croog, 1983). Successful social adjustment depends in part on

attempts at resuming social activities and roles. Patients may cope by withdrawing; however, if this persists it can be maladaptive, as ongoing involvement with others sustains social roles and personal identity (Mechanic, 1977).

Descriptive studies and anecdotal evidence pertaining to the marital and family relationships of heart patients have described quarrelling, decreased communication, marital estrangement, feelings of inadequacy, depression, and sexual difficulties (Croog, 1983; Mayou et al., 1978; Stern & Pascale, 1979; Davidson, 1979). Marital dysfunction was reported by 16% to 25% of CABS patients 12 months post-operatively (Langeluddecke et al., 1989; Jenkins et al., 1983). Following an MI, as many as 50% of couples report marital deterioration (Wishnie et al., 1971; Stern & Pascale, 1979; Runions, 1985; Waltz, 1986). Because the prevalence of marital dysfunction has not been measured prior to cardiac events, there is no baseline against which to determine any changes. However, patients in conflictual marriages reported more psychological distress compared to those who experienced greater intimacy (Waltz, 1986). Wives reporting worsening relationships identified their husbands as being emotionally withdrawn and self-protective, dependent, demanding of attention, and slow to progress (Sikorski, 1985; Skeleton & Dominion, 1973). Anxious patients reported increased distress and friction in interpersonal relationships, and patients who continued to experience anxiety 6 months post-MI had more marital adjustment difficulties than did non-anxious patients (Stern, et al., 1977).

Fear of recurrence may generate overprotective attitudes toward the recovering patient. For example, 50% of CABS spouses reported worrying more about the patients' health after surgery (Wishnie et al., 1971; Jenkins et al., 1983). Thirty-six percent of CABS patients felt they were overprotected, whereas only 5% thought others' expectations for them were too high (Jenkins et al., 1983; Stanton et al., 1984). Patients reported resenting overprotectiveness and excessive concern, felt humiliated over giving up some of their responsibilities, and consequently felt uncertain about performing ordinary daily tasks (Doehrman, 1977; Mayou et al., 1978; Davidson, 1979; Bilodeau & Hackett, 1971). Other investigators have noted that overprotectiveness may bring about greater levels of incapacitation (Wishnie et al., 1971).

Conflict is not a consequence of cardiac disease in all affected families. Studies have found that, after a MI/CABS, communication in marital relationships increased for some patients (Stern et al., 1977; Mayou et al., 1978; Jenkins et al., 1983). Sikorski (1985) found that an improvement in the marital relationship was characterized by better expression of feelings and greater appreciation for the spouse. Feelings of adequacy and security in the spouses of MI patients were also associated with better medical and psychological adjustments in patients (Ruskin et al., 1970).

Patients have also reported reduced sexual activity during recovery due to depression, anxiety, decrease in desire, fear on the part of themselves or their spouse of relapse or death, fatigue, angina, or impotence. Although as many as 60% of MI patients and 35% of CABS patients do not resume premorbid levels of sexual activity,

these changes are more often associated with psychological and interpersonal rather than physiological consequences of heart disease (Doehrman, 1977; Langeluddecke et al., 1989; Mayou, 1979; Rejeski et al, 1985; Horgan et al., 1984; Trelawny-Ross et al., 1987; Heller et al., 1974; Hellerstein & Friedman, 1970; Jenkins et al., 1983; Wiklund et al., 1984b; Bilodeau & Hackett, 1971; Jackson, 1978; Mayou, 1986). Apparently, many couples fear that intercourse involves too much physical activity to be considered safe (Bloch, Maeder, & Haissly, 1975).

Return to work represents resumption of an important role and is considered an central indicator of successful rehabilitation. The majority of patients who return to work do so within 6 to 12 months of their cardiac event (Stern et al., 1977; Jenkins et al., 1983; Gutmann, Knapp, Pollock, Schmidt, Simon, & Walcott, 1982). Between 5% to 44% of CABS patients and 10% to 55% of MI patients do not return to work by 6 months and 1 year after hospital discharge (Magni et al., 1987; Horgan et al., 1984; Jenkins et al., 1983; Kornfeld, Heller, Frank, Wilson, & Malm, 1982; Trelawny-Ross & Russel, 1987; Brammell, 1981; Stern et al., 1977; Kinchla & Weiss, 1985). Patients in blue-collar occupations may be 15 times less likely to return to work than those in non-manual jobs (Bryant & Mayou, 1989; Mayou, 1979). Physical symptoms appear less associated with return to work than are such factors as depression and anxiety (Doehrman, 1977; Garrity, 1973; Ruskin et al., 1970). Those who are forced to retire experience more negative emotional changes (e.g., loss of self-esteem and self-acceptance), which interferes with their recovery (Zyzanski et al., 1981). Higher rates of

return to work are associated with higher educational status, higher functional capacity, high morale, and employed (as opposed to unemployed) status prior to the cardiac event. Those with lower education, blue-collar occupations, lower functional capacity, lower morale, and who were unemployed prior to the cardiac event are at greater risk for non-return. In addition, those close to retirement age are more likely to retire or reduce either their work-hours or work-load after an MI (Croog, 1983; Kinchla & Weiss, 1985; Mayou & Bryant, 1987).

Between 20% and 35% of patients may require modification of job tasks, such as lifting, carrying, avoiding stressful situations, or reducing the number of hours worked (Brammell, 1981; Jenkins et al., 1983; O'Connor, 1983). Twenty percent of patients reported experiencing greater tension and distress at work than they had prior to their cardiac event (Stern et al., 1977; Mayou & Bryant, 1987). Langeluddecke et al. (1989) found 50% of their sample had residual impairment in work performance at a 12 month follow-up.

In the domain of leisure activities, Rejeski et al. (1985) have noted that some patients drastically reduce the amount of time spent doing these activities. Others, however, have found that leisure activities had returned to baseline levels by 1 year after their cardiac event (Wiklund et al., 1984b; Jenkins et al., 1983; Mayou & Bryant, 1987; Mayou, 1986). Trelawny-Ross and Russell (1987) found that 23% of MI patients had not returned to previous levels of leisure activity 6 months post-infarct. Between 19% and 30% of CABS patients reported a decrease in social activities at 12 months

(Langeluddecke et al., 1989; Horgan et al., 1984; Heller et al., 1974; Jenkins et al., 1983). Mayou et al. (1978) also found that patients who returned to work often decreased their leisure activity.

Domestic activities requiring physical stamina are often abandoned during the early months of convalescence. In at least one study, 25% of patients continued to report difficulties in performing previous home management activities 12 months post-operatively (Langeluddecke et al., 1989; Jenkins et al., 1983). Resumption of domestic activity was negatively correlated with age (Mayou, Williamson, & Foster, 1978).

In summary, the literature reviewed in this section illustrates that cardiac patients must make a number of physical, psychological, and social adjustments. Physiological consequences are experienced beyond one year following the cardiac event, and, as would be expected, influence the resumption of life activities. Resumption of such activities however, also requires adjustment to the psychological and social consequences of the event. As was discussed, psychological distress disrupts physical, social, and occupational functioning. Alterations in marital, family, and vocational functioning are experienced by many. The physical, psychological, and social sequelae of CHD have reciprocal relationships, and an accurate understanding of adjustment thus requires studying their interrelationships.

Social adjustment has repeatedly emerged as an essential component of successful rehabilitation (Bolton, Rowland, Brookings, Cook, Taperek & Short, 1980). However, few studies have examined the specific process by which social adjustment occurs in

cardiac patients (Wortman & Conway, 1985). Much of the research on recovery and adjustment, moreover, has employed descriptive or cross-sectional designs. There is a lack of prospective research utilizing standardized instruments to measure outcome variables and their predictors (Krantz & Deckel, 1983).

2.2 Determinants of Adjustment to Chronic Illness

Including Heart Disease

As described above, a significant proportion of cardiac patients continue to view themselves as being severely impaired and do not resume normal life activities up to, and beyond, one year after their cardiac event (Wiklund, Sanne, Vedin & Wilhelmsson, 1985). The nature and degree of impaired adjustment varies between patients. In addition to specific heart disease stressors, how the patient copes with these demands must be understood if effective intervention strategies supporting adjustment are to be developed (Moos, 1977; Coyne & Holroyd, 1982). For example, in a community sample of adults with heterogeneous physical disabilities, Turner, Wood, Levin, Noh, and Frankel (1983) found that social support, coping strategies, and personal mastery accounted for the largest portion of the explained variance in psychological adjustment to disability, and that demographic and disability-related factors were less important.

Because adjustment cannot be completely explained by demographic variables or by the physical severity of illness, a broader range of variables must be studied. Recent studies have considered such factors as 1) the adaptive tasks and stressors imposed by

illness, 2) the patient's sense of personal mastery over life circumstances, and 3) coping strategies used to deal with disease-related stressors.

Little is known about the specific determinants of adjustment to heart disease. Consequently, adjustment to chronic illness in general is also discussed to address the domain of potentially relevant variables. Perspectives on stress and coping are reviewed to provide a context for studies addressing coping with heart disease and chronic illness. This section begins with a review of generic stress models, then considers personal mastery as a dispositional resource in mediating stressful encounters. Subsequently, coping theory and research are reviewed generally, and in terms of chronic illness and heart disease specific issues.

2.2.1 Stress

Early stress theory and research examined how extreme situations interrupt behavioural, physiological, and emotional functioning. Stress was viewed either as an external condition or as an internal response to the stressful event. Life events have been construed as major environmental stressors that negatively affect individual adaptation (Holroyd, 1979; Lazarus & Folkman, 1984). This approach has been criticized for ignoring the person-specific meaning of stressors. Typically, life events are assessed for a period of 6 to 12 months prior to the measurement of the dependent variable, by which time their threat value may be negligible (Weinberger, Hiner, & Tierney, 1987). An alternative approach is offered by the study of daily hassles, defined

as irritants encountered in daily life, such as traffic jams or having an argument with a family member. Hassles have been found to be better predictors of morale, psychological symptoms, and somatic health than are life events (Lazarus, 1984; DeLongis et al., 1982; Kanner, Coyne, Shaefer, & Lazarus, 1981; Zarski, 1984). Correlations between life events and hassles are relatively weak, suggesting that they are separate constructs. Hassles may be a stronger predictor of health status than life events because the time of measurement is more proximal and they may be cumulatively more salient for the individual. Daily hassles are also more amenable to therapeutic interventions because, unlike life events which often cannot be reversed, they often represent misperceptions of irritants or difficulties in managing daily routines (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982). Regarding chronic illnesses, others have found that life stress in the previous year was only minimally correlated with patients' perceived ability to cope with multiple sclerosis (Counte, Bieliauskas, & Pavlou, 1983). Although the number of life events did not differentiate between headache-sufferers and controls, number of hassles did (Holm, Holroyd, Hursey, & Penzien, 1986).

Because linear cause-effect (S-R) stress models did not explain individual differences in response to similar stressors, investigators began to examine cognitive appraisal and coping processes. It is now widely assumed that the health consequences of stress are influenced not only by the nature of the stressor but also by the appraisals of it and by the coping strategies employed to adjust to its demands (Tobin, Holroyd, Reynolds, & Wigal, 1989; Holroyd, 1979).

Lazarus and Folkman (1984) have proposed that "...psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). Stress is thus viewed as a transaction between environmental demands and the individual's capacity to deal with these demands and is defined as a cognitively mediated relational concept. This transactional model emphasizes cognitive appraisal of stressors and coping as a process. Some theorists emphasize that stressors should be studied as environmental inputs independent of the person's appraisal of the stressor in order to minimize confounding with psychological distress (Dohrenwend & ShROUT, 1985). However, such an approach emphasizes a stimulus definition of stress and does not take into account sufficiently the individual's appraisals of stressors. Lazarus, DeLongis, Folkman, and Gruen (1985) have argued that it is impossible to separate the environment and the person because stress is a relational and cognitively mediated phenomenon.

2.2.2 The Adjustive Demands and Stressors Imposed by Chronic Illness Including Heart Disease

Turk, Sobel, Follick, and Youkilis (1979, 1980) emphasize that disease-specific knowledge of the process of adaptation (i.e., including relevant adaptive tasks and strategies used to meet them) is essential for the development of interventions aimed at enhancing coping. Potential adjustive demands may include technical management,

vocational adjustment (e.g., change in occupation), social adjustment (e.g., reduction in social activities), marital/sexual adjustment (e.g., diminished sexual drive), family adjustment (e.g., alterations in patient's family role), emotional adjustment (e.g., depression and anxiety), and physical ailments (e.g., pain). The number of tasks and their duration and intensity will vary between individuals (Turk, 1979). Other authors have identified the following illness-related tasks: reducing harmful environmental conditions and increasing prospects of recovery, tolerating or adjusting to negative events, maintaining a positive self-image, maintaining emotional balance, and continuing satisfying relationships with others (Moos & Tsu, 1977; Cohen & Lazarus, 1979).

Several reports have indicated that MI patients have six or seven problem areas that require adaptive efforts: 80% to 84% of patients were concerned about the uncertainty and implications of chest pain or discomfort, shortness of breath, and fatigue; 60% reported concerns about generalized feelings of anxiety and depression; 50% to 70% were concerned about work, including making decisions about changing jobs or retiring because of their heart condition; 30% were concerned about their financial situation; and 20% patients reported family and/or marital problems (Frasure-Smith & Prince, 1985; Wiklund et al., 1984a; McCorkle, & Quint-Benoleil, 1983). Similarly, CABS patients have to make moderate to extensive adjustments due to lack of energy, limited activity, learning to slow down, increased emotional sensitivity, and sleep difficulties (Stanton et al., 1984).

Evaluation of the adaptive demands experienced by patients would help to define the kinds of stressors they experience and the range of tasks for which coping strategies are employed.

2.2.3 Personal Mastery - A Psychological Resource

Pearlin and Schooler (1978) describe psychological resources as personality characteristics that individuals can use to deal with stressors in the environment. These resources are viewed as being an important element in mediating the effects of stress and strain. *Personal mastery* is the "extent to which one regards one's chances as being under one's control in contrast to being fatalistically ruled" (Pearlin & Schooler, 1978, p. 5). Individuals with a personal ability to maintain control over their life situation are more open, confident, and feel they can shape their environment. Passivity and withdrawal can result when individuals feel that life is determined by forces beyond their control (Mechanic, 1977). Perceptions of not being in control can increase the impact of undesirable events, leading to feelings of helplessness and discouragement (McFarlane, Norman, Streiner, Roy, & Scott, 1980). Personal mastery was found to be negatively associated with psychological symptoms in a normal community sample (Folkman, Lazarus, Gruen & DeLongis, 1986). A meta-analysis of studies on coping behaviours and resources recently found that increases in personal resources (i.e., self-confidence, self-esteem, and sense of personal control) decreased stress (Matheny, Aycock, Pugh, Curlette, & Silva Cannella, 1986).

Turk (1979) found that colostomy patients with a strong sense of personal mastery adjusted to their illness more favourably. They maintained active involvement in disease management and were optimistic about meeting the adjustive demands imposed by the illness. In a study of haemodialysis patients, those who believed they had control over their illness outcomes received better staff ratings on coping and behavioural compliance (Witenberg, Blanchard, Suls, Tennen, McCoy, & McGoldrick, 1983). Rheumatoid arthritis patients who perceived greater control over their medical care and treatment had more positive mood and psychosocial adjustment (Affleck, Tennen, Pfeiffer, & Fifield, 1987).

A study with CABS patients that used a similar construct, internal locus of control, found that those who were internally oriented (i.e., saw events as contingent on their own behaviour) accepted their physical limitations and were more likely to make positive modifications to their life-style (Ramshaw & Stanley, 1981). Personal mastery may well be an important resource for adjustment to stressors associated with heart disease.

2.2.4 Coping Models and Definitions

Compared with disagreements about the nature of stress, there are even more differences of opinion about what is meant by coping and its role in the process of adaptation. Traditional approaches to the concepts of coping and adaptation developed out of psychoanalytic ego psychology, as investigators attempted to differentiate between

coping strategies and defense mechanisms. Defense mechanisms were viewed as rigid, intrapsychic, unconscious methods of dealing with stressors that, when overused, led to maladjustment. Alternatively, coping strategies were viewed as flexible and adaptive responses to stressors. These two phenomena were organized hierarchically, with defense mechanisms being perceived as being less mature or promoting greater disorganization (Haan, 1977; Andrews, Tennant, Hewson & Vaillant, 1978). However, this hierarchical approach creates a bias, as some coping behaviours are predetermined to be maladaptive. For example, denial, which is viewed as a distortion of reality, is considered dysfunctional. In instances where an individual cannot change any aspects of a threatening or harmful situation, however, denial processes may help to decrease distress (Lazarus & Folkman, 1984; Moos & Tsu, 1977; Hackett & Cassem, 1974). Another limitation of this approach is that it focuses exclusively on the regulation of emotion and does not consider strategies directed at managing problems (Folkman, 1982).

Approaches based on the ego psychology model have also measured coping as a disposition (i.e., trait or style) rather than as a process. Coping dispositions refer to tendencies to use a specific mode or pattern of coping across a variety of stressful situations. The measures tend to ask how individuals cope generally with stressors and often require retrospective reports, resulting in measurement imprecision. The dispositional approach may underestimate the variability and complexity of coping processes and does not consider the many different coping strategies used in managing

day-to-day stressors (Lazarus, 1984; Lazarus & Folkman, 1984; Folkman, 1982). In addition, there is little evidence suggesting consistency in the mode of coping used from one situation to another. Coping styles are assessed without reference to the demands of the situation, coping options available, or social supports that influence which coping strategies an individual will use. Moreover, coping is equated with adaptational success, thus confounding the process of coping and its outcome. Within this framework, coping also implies mastery over the environment. Many sources of stress, however, cannot be mastered and effective coping in this type of situation would consist of either accepting, ignoring, or minimizing what cannot be mastered (Lazarus & Folkman, 1984; Folkman, 1982; Cohen & Lazarus, 1979). Dispositional measures have not been found to predict level of anxiety well, whereas process coping measures do (Kaloupek, White & Wong, 1984; Kaloupek & Stoupakis, 1985).

Another approach to coping measurement, the situation-oriented approach, assesses how individuals cope with the demands of a specific situation such as an exam or illness. This approach allows for the study of the coping process but because of its focus on a specific stressor, may not be generalizable to other situations (Folkman, 1982).

The process-oriented approach to coping (Lazarus & Folkman, 1984) addresses the limitations of the ego/dispositional and situation-oriented approaches to coping. *Coping* in this model is defined "...as constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing

or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). There are three key features to this approach: (1) coping is viewed as a process, rather than a trait or style; (2) coping includes ongoing efforts to manage person-environment encounters instead of focusing on outcomes of coping; it can therefore be used to predict outcome; and (3) coping is viewed as managing stressors, not (necessarily) mastering them.

In addition, the process approach emphasizes the necessity of measuring what the individual actually does or thinks within a specific context and over time. Coping is viewed as a shifting process: as a stressful event evolves, coping thoughts and acts change. The change occurs because of the continuous appraisals and reappraisals of the person-environment relationship. The shifts may be due to coping efforts directed at modifying the environment, or directed toward inner experience. Any shift in the person-environment relationship will result in a re-evaluation of the perceived stressor on the part of the individual. Consequently, this reappraisal will influence further coping efforts (Lazarus & Folkman, 1984; Folkman, 1982).

Cognitive appraisal refers to the evaluative cognitive processes that mediate between the event and the reaction by which the individual judges the importance of the event to his/her well-being. Lazarus and Folkman (1984) have identified three types of primary appraisal: irrelevant, benign-positive, or stressful. *Stressful appraisals* include judgments of harm/loss, threat, or challenge. In *harm/loss*, some damage has been experienced by the individual, such as illness or damage to self-esteem. *Threat* denotes anticipated harm/loss. The individual anticipates negative results in the future and

experiences negative emotions such as anger, anxiety, or fear. However, anticipatory coping efforts can be used in order to plan or work through difficulties before the event occurs. *Challenge appraisals* focus on the potential for gain or growth inherent in an encounter and they are characterized by pleasurable emotions such as enthusiasm and excitement.

Secondary appraisal is a judgment regarding what can be done to manage the situation. It involves evaluating which coping alternatives are available, whether the coping strategy will adequately bring about an expected outcome, and whether the individual feels s/he is capable of utilizing the coping strategy effectively. Stress will increase if the individual cannot prevent or control a harm/loss situation or if s/he feels that the situation cannot be managed. Challenge appraisals are more likely to occur when the individual has a sense of control over the stressful person-environment relationship. Appraisal processes will determine the magnitude of a stress reaction and the coping strategies employed.

Reappraisal refers to a changed appraisal based on new information from the individual's own reactions and/or environmental feedback. Reappraisal is part of a feedback system because it follows an initial appraisal. For example, a threat can be transformed into a challenge if it is reappraised in terms of possibility for growth. Lipowski (1970) describes some patients who view illness as a challenge and not as a threat. Taken together, appraisal of the individual's coping resources and appraisal of

the environment determine whether the event will be evaluated as potentially stressful (Lazarus & Folkman, 1984; Folkman, 1982; 1984).

Two types of coping have been identified by Lazarus and Folkman (1984), *problem-focused* (coping that is aimed at changing the ongoing person-environment relationship) and *emotion-focused* (coping that is directed at controlling the emotional response or physiological arousal). Problem-focused coping is used when either environmental conditions or one's own behaviour can be changed. Strategies include defining the problem, generating alternative solutions, weighing the alternatives in terms of costs and benefits, choosing among them, and finally acting, as well as reducing environmental barriers and gaining access to resources. Problem-focused coping also consists of strategies that are directed inward to change motivations or cognitions (e.g., finding alternative modes of gratification, decreasing ego-involvement, developing new skills and procedures, or changing present standards of behaviour) (Lazarus & Folkman, 1984; Folkman, 1982; 1984).

Emotion-focused coping involves efforts directed at decreasing emotional distress and preserving an internal state conducive to processing information and action. Strategies consist of cognitive processes such as minimization, selective attention, positive comparison, distancing, avoidance, and extraction of positive meaning from negative events. Emotion-focused coping changes the manner in which the situation is perceived without changing its nature (Lazarus & Folkman, 1984; Folkman & Lazarus, 1988; Folkman, 1982). Emotion-focused coping is often used in situations where it is perceived

that nothing can change harmful, threatening, or challenging environmental conditions. Where change is appraised as being possible, problem-focused strategies are more likely to be used (Folkman & Lazarus, 1980).

In "changeable" encounters, subjects tended to use strategies that helped them focus on the situation -- confrontive coping, planful problem-solving (problem-focused), accepting responsibility, and positive reappraisals (emotion-focused). However, in encounters that needed to be accepted, distancing and escape-avoidance strategies (emotion-focused) were used most often, thus allowing the subjects to focus away from the troubling situation (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Folkman & Lazarus, 1985). Confrontive coping, planful problem-solving, and seeking social support were not used consistently across situations, but were rather influenced by the situational context, whereas positive reappraisal was more stable across situations suggesting that personality factors may contribute to its use (Folkman et al., 1986). In work situations, problem-focused coping was used most frequently, as problems at work were appraised more frequently as changeable. Regarding health-related stressors, when the stressors were appraised as requiring acceptance, emotion-focused coping strategies were used most often. The coping strategies of seeking social support and escape-avoidance were more frequently employed. In the context of family stressors, both problem- and emotion-focused coping were used (Folkman & Lazarus, 1980).

Individuals tend to employ an average of 6.5 forms of coping in each stressful encounter, and between 94% to 98% of stressful episodes experienced are handled with

both problem- and emotion-focused coping responses (Folkman & Lazarus, 1980; Folkman et al., 1986; Folkman & Lazarus, 1985).

Coping with extreme stress often involves, first, regulating the emotional impact of the situation (emotion-focused); and, second, recognizing the harm, loss or threat, which then enables the individual to change the person-environment relationship through coping efforts (problem-focused) (Coyne & Holroyd, 1982; Roskies & Lazarus, 1980; Folkman & Lazarus, 1988). Coping strategies can have interpersonal effects. For example, confrontive coping (a problem-focused strategy) can alienate others if it involves expression of anger and/or hostility, or the use of distancing and escape-avoidance (emotion-focused strategies) can perpetuate avoidance and inhibit the potential helpfulness of others (Folkman & Lazarus, 1988).

Other theorists have suggested that coping strategies can be organized as approach and avoidance (Roth & Cohen, 1986; Cohen & Lazarus, 1973). However, examining only the approach-avoidance paradigm does not account for the various cognitive and behavioural strategies used to cope with the complex demands of a given stressful encounter (Folkman & Lazarus, 1988). Much of the research examining the approach-avoidance paradigm has treated coping as a trait. Roth and Cohen (1986) have stated that it is difficult to characterize individuals as approachers and avoiders because individuals use both strategies in a variety of stressful situations.

Tobin et al. (1989) examined how problem- and emotion-focused coping and approach and avoidance coping were related to each other and in relationship with

specific coping strategies. Using factor analysis they found two tertiary factors termed engagement and disengagement. Four secondary factors representing Lazarus' problem- and emotion-focused coping constructs were found within the engagement and disengagement paradigm and have been termed problem engagement, emotion engagement, problem disengagement, and emotion disengagement. The four coping strategies loading on engagement include problem-solving, cognitive restructuring, seeking social support, and expressing emotions. These strategies consist of active efforts to manage or change stressful encounters as well as efforts to decrease emotional distress. The strategies found on the disengagement factor include problem-avoidance, wishful thinking, self-criticism, and social withdrawal. These strategies serve to remove the individual from the person/environment transaction. Problem engagement consists of problem-solving and cognitive-restructuring strategies used to manage stressful encounters, whereas problem disengagement consists of wishful-thinking and problem-avoidance efforts used to avoid dealing with the stressor. Emotion engagement include express-emotions and social support strategies used to manage emotional reactions to stressors, and emotion disengagement consist of self-criticism and social withdrawal, strategies used to avoid the stressor. This conceptual framework provides an integration of the major coping constructs in the current literature.

Cognitive appraisal and coping involve complex processes, and a variety of processing problems can occur. The individual may appraise threat where there is none and consequently experience emotional arousal and engage in coping activity that is

unnecessary, or the person may fail to appraise threat when it is appropriate. These defects are situated in primary appraisal and its determinants. Problems can also exist in secondary appraisal, as when an individual appraises his/her coping resources unrealistically. Problems can also center on the coping activity itself (e.g., where the person is unable to discard problem-solving coping when emotion-focused coping is more appropriate, or the individual may be unable to seek emotional support). The two functions can also be in conflict, as when emotion-focused coping prohibits or delays problem-focused coping (Lazarus & Folkman, 1984).

Appraisal and coping are thought to affect short-term and long-term outcome. How individuals appraise and cope with stressors can be linked to adaptational outcomes such as morale, social functioning, and somatic health (Lazarus & Folkman, 1984; Vogel, 1985). *Morale* has been defined as a short-term outcome (i.e., the emotions experienced in a situation). The individual's expectations of the situation and his/her satisfaction with the outcome will determine the person's short-term morale. During a stressful encounter, the individual may experience a variety of emotions. The individual's appraisal and how effectively s/he manages the range of emotions will eventually affect his/her psychological well-being in the long term. If an individual consistently appraises situations as challenges rather than as threats and can endure negative experiences, that individual will likely have a greater sense of well-being. Morale also depends on the effectiveness of an individual's coping strategies in different encounters. Individuals who cope effectively with daily stressors are more likely to experience more satisfaction and

achieve personal goals (Lazarus & Folkman, 1984). Examining individuals' appraisals and the specific coping strategies used in different encounters could provide insight into the processes linked to psychological distress.

Social functioning has been defined in numerous ways but implies an individual's fulfilment of his or her various work, family, social & leisure roles. Appraisal and coping influence social functioning. For example, appraising an interpersonal relationship at work as threatening may encourage the individual to avoid the individual, subsequently affecting his/her job performance. A cardiac patient who appraises role demands as health threats may cope by avoiding them. Individuals who appraise social functions as challenges will likely assume their social roles more rapidly and completely.

Stress and coping have also been examined in relation to somatic health. The perception of threat influences both physiological and psychological stress reactions and this perception appears antecedent to various biochemical stress reactions (Turk, Meichenbaum, & Genest, 1983; Vogel, 1985). There are three ways that dysfunctional coping patterns might negatively affect somatic health outcomes. First, coping can influence the frequency, intensity, duration, and the patterning of physiological responses, such that physiological processes might be disrupted (e.g., elevation in blood pressure) (Vogel, 1985; Roskies & Lazarus, 1980). Second, coping can affect health through the use of injurious substances such as alcohol, tobacco, and drugs (Vogel, 1985; Roskies & Lazarus, 1980). Third, certain coping strategies (e.g., denial of symptoms), when dealing with acute (Gentry, 1979; Pranulis, 1975; Hackett & Cassem, 1974) or chronic illness

(Turk, 1979; Moos & Tsu, 1977), can influence the course of recovery and/or medical attention received (Lazarus & Folkman, 1984; Holroyd, 1979; Coyne & Holroyd, 1982). Folkman et al. (1986) found that greater threat appraisals and use of coping were associated with poorer somatic health status (Folkman et al., 1986). Given the widespread belief that cardiac patients are vulnerable to stress (Croog, 1983), it is important to examine the relationship between stressors, coping, and outcomes.

A model to study the coping process among cardiovascular or cerebrovascular diseases was developed by Egger and Stix (1984). It emphasizes the patient's experience of the illness, the medical treatment received, and social-environmental reactions. Limitations of the model are that coping is defined as the patient's reactions to the adaptive tasks (which confounds coping with outcomes), and the reactions are examined to the illness and not in relation to the various illness-tasks. Another framework, developed by Wiklund et al. (1985), examines the recovery process of an MI in relation to the stages of crisis theory. Coping in this model is defined as the employment of ego defense mechanisms that are predetermined to be adaptive or maladaptive (maladaptive coping strategies include physical restrictions, passivity, dependency, acceptance of the sick role, and avoidance behaviour). Coping is not examined in relation to specific tasks but is viewed in terms of reaction to or outcome of the event. As in the previous model, coping is confounded with outcomes.

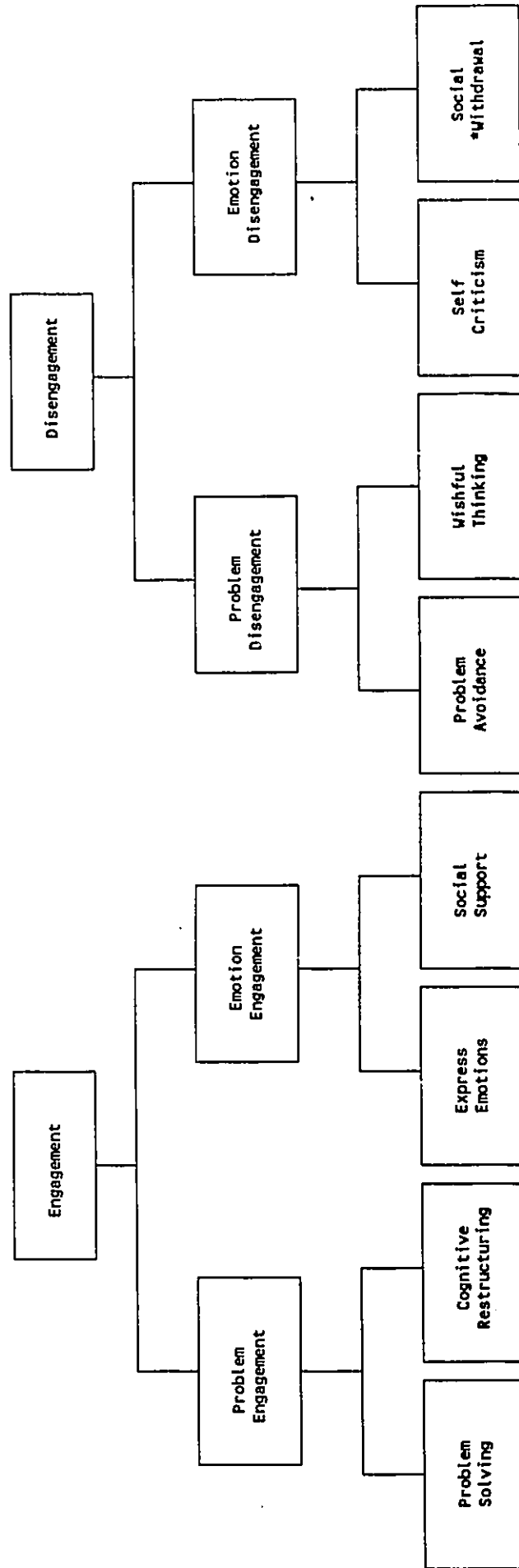
Taxonomies of Coping

A number of taxonomies of coping behaviour have been developed. Moos and Tsu (1977) have classified coping responses used by individuals adjusting to physical illness. They identified and described seven classes of coping skills: (1) denying or minimizing the seriousness of a crisis, (2) seeking relevant information, (3) requesting reassurance and emotional support, (4) learning specific illness-related procedures, (5) setting concrete limited goals, (6) rehearsing alternative outcomes, and (7) finding a general purpose or pattern of meaning in the course of events.

Lazarus & Folkman (1984) have also provided a taxonomy for classifying coping strategies according to *mode* (direct action, action inhibition, information search, or intrapsychic) and *function* (problem-focused, or emotion-focused coping). The revised "Ways of Coping Checklist" (WCCL; Folkman & Lazarus, 1985) provides 66 items covering the four basic modes of coping to identify which strategies individuals use. Each item is classified as either problem-focused or emotion-focused. One of the factor analyses performed on the WCCL has identified two forms of problem-focused coping and six forms of emotion-focused coping. Problem-focused coping includes confrontive coping and planful problem-solving. The emotion-focused coping strategies consist of distancing, escape-avoidance, accepting responsibility, self-control, seeking social support, and positive reappraisal (Folkman et al., 1986). In another factor analytic study, Aldwin and Revenson (1987) found 3 forms of problem-focused coping, 4 forms of emotion-focused coping, and 1 social support factor which include both problem- and emotion-

focused items. The WCCL appears limited by instability of its factor structure and correspondingly questionable construct validity. Some scales contain both avoidant and help-seeking strategies, which makes interpretation difficult (Vitaliano, Maiuro, Russo, & Becker, 1987; Vitatiano, Russo, Carr, Maiuro, & Becker, 1985; Chartier, 1989). Another disadvantage of the scale is that problem- and emotion-focused coping strategies are not equally represented.

Tobin et al. (1989) developed the "Coping Strategies Inventory" (CSI) to assess coping thoughts and behaviours in response to specific stressors. They have also examined the structure of coping, using hierarchical factor analysis, in order to organize coping strategies into higher-order categories. The CSI contains 72 items (23 from the WCCL) and is based on the Tobin et al. (1989) hierarchical model with three levels: eight primary scales, four secondary scales and two tertiary scales (see Figure 1). The primary subscales consist of specific coping strategies used to deal with a stressful event: problem-solving, cognitive-restructuring, expression of emotions, social-support, problem-avoidance, wishful thinking, self-criticism and social-withdrawal. The secondary subscales reflect Lazarus and Folkman's construct of emotion- and problem-focused coping: problem-focused engagement (cognitive and behavioural strategies used to change the situation, or the meaning of the situation), emotion-focused engagement (communication of feeling to others, and increased social involvement), problem-focused disengagement (cognitive and behavioural strategies to avoid the situation), and emotion-focused disengagement (avoiding others and self-criticism). The tertiary



* hypothesized factor

Figure 1. Hierarchical Factor Structure of the Coping Strategies Inventory (CSI).

subscales reflect the constructs of approach and avoidance and have been labelled engagement (efforts to manage person/environment transactions) and disengagement (avoiding person/environment transactions). Factor analytic support for this hierarchical structure has been reported by the authors, and Chartier (1989) found engagement and disengagement coping correlated more strongly with psychological and physical symptomatology than did emotion- and problem-focused coping.

Latack (1986) conceptualized coping in terms of control, escape, and symptom management categories. Control strategies consist of both actions and cognitive reappraisals that are proactive; escape strategies consist of actions and cognitive reappraisals that are avoidant in nature; and symptom management strategies consist of managing symptoms related to stress in general. The definitions of control and escape are similar to Tobin's (Tobin et al., 1989) engagement and disengagement subscales. The addition of symptom management strategies is important, however, in the measurement of coping as it includes physical-emotional strategies such as relaxation and exercise that are not measured by the other approaches.

Effects of Coping on Physical, Psychological, and Social Outcomes

Given the various conceptual frameworks in the area of coping research, integration of findings cannot be easily achieved. The relationship between the constructs of approach-avoidance coping and emotion- and problem-focused coping have not been frequently examined. Consequently, findings from both of these paradigms are

presented here. This section deals with the effects of coping on conditions other than chronic illness. The subsequent section discusses the effects of coping on chronic illness and heart disease.

In a meta-analysis examining the effects of approach-avoidance coping strategies on physiological responses, Muellen and Suls (1982) found that avoidance produced better physical adaptation (i.e., fewer symptoms, reduced physiological responses) in the short-term, perhaps by reducing stress and preventing anxiety from becoming overwhelming while allowing for gradated awareness (Roth & Cohen, 1986). However, in the long-term, approach coping produced better physical adaptation. Avoiding an immediate stressor may reduce physical reactivity and conserve energy resources in the short-term; in the long-term, however, avoidance may tax coping resources by abetting the accumulation of stressors. Approach coping may support long-term physical adaptation by facilitating instrumental coping, thereby reducing or eliminating the stressor and permitting expression of affect (Roth & Cohen, 1986).

Roth and Cohen (1986), in a review of the effects of approach and avoidance coping on emotional adjustment, have also concluded that avoidance may be helpful during the initial stage of a stressful encounter if resources are lacking. Also, avoidance may be more beneficial in situations appraised as uncontrollable, whereas an approach strategy may be beneficial in situations where some control can be exerted. Regarding relative potential costs and benefits, the benefits of approach coping include direct action, ventilation of affect, and problem-solving. Approach costs include increased

distress and worry through attending to the situation. Avoidance benefits include stress reduction, allowing for graduated awareness of the stress and increasing hope; however, avoidance can block the individual from finding appropriate solutions, and increase emotional numbness and disruptive avoidant behaviours to keep the threatening situation out of awareness.

Avoidant coping strategies have been associated with lower anxiety and distress scores with acute stressors, such as blood donation (Kaloupek et al., 1984; Kaloupek & Stoupakis, 1985) and dental treatment (Wong & Kaloupek, 1986). Because direct action cannot be taken in these situations, an avoidant coping strategy may be most adaptive (Kaloupek & Stoupakis, 1985; Kaloupek, White, & Wong, 1984).

Pennebaker (1985) notes that studies examining physiological arousal have found that in the long-term, individuals who avoid discussing their experience ("repressive coping style") experienced greater physiological arousal (i.e., higher heart rate, muscle tension, etc.) and higher occurrence of physical disease than did emotionally expressive individuals. Disclosing feelings and thoughts about events may facilitate 'cognitive reframing and reorganization of the event, which, in turn, decreases physiological arousal.

Research with non-medical subjects has suggested that individuals using avoidance coping have greater impairment of functioning as measured by anxiety, depression, and/or physical symptoms. More reliance on active coping and fewer attempts to avoid dealing with the stressor are associated with less symptomatology (Billings & Moos, 1981;

Holahan & Moos, 1985; Kobasa, 1982; Schill, Ramamaiah, & O'Laughlin, 1984).

Reliance on avoidance coping ("disengagement") in dealing with grief was found to decrease self-esteem and life satisfaction and increase loneliness, depression, somatization, and perceived stress (Chartier, 1989).

Avoidant coping was found to be more strongly associated with psychological distress even though it is used proportionately less often than approach-coping strategies (Nicholson, 1989; Holahan & Moos, 1985). In these studies the actual amount of avoidance coping (as opposed to approach coping) distinguished between individuals who experienced physical and depressive symptomatology and those who did not (Holahan & Moos, 1985).

Others have found that avoidant coping strategies, such as "selective ignoring", exacerbated stressors associated with marriage and parenting (Pearlin and Schooler, 1978). Similarly, Menaghan (1982) found that attempting to cope with marital problems by using withdrawal or resignation increased distress and exacerbated future relationship problems. Negotiations and optimistic comparisons (which can be conceived as approach strategies) were linked with lower distress and fewer future problems.

Comparing depressed patients and non-depressed controls, Holahan & Moos (1987) found that both active and avoidance coping were used in stressful situations; depressed patients, however, were more than twice as likely to use avoidance coping than nondepressed subjects. Active coping was associated with more personal resources such as self-confidence, social support, and less avoidance coping, while avoidance coping was

associated with fewer resources. Avoidance coping occurred in situations appraised as threatening and when personal and environmental resources were scarce.

Folkman and Lazarus (1986) found that depressed subjects used more confrontive coping, self-control, escape-avoidance, and support-seeking than did non-depressed subjects. No differences were found between depressed and non-depressed subjects on distancing, planful problem-solving, and positive reappraisal strategies. Depressed patients experienced more stress, used less problem-focused coping (i.e., problem-solving) and more emotion-focused coping (i.e., emotional discharge, eating more) when compared to a nonpatient group, and they used coping skills that exacerbated their stress responses (Mitchell, Cronkite, & Moos, 1983). Furthermore, wishful thinking has been positively related to depression, whereas problem-focused coping has been observed to have a negative relationship with depression in three different samples -- psychiatric outpatients, spouses of patients with Alzheimer's disease, and medical students (Vitaliano et al., 1987). After statistical controls were applied for prior mental health status and stress level, escapism, self-blame, and seeking social support were related to increased emotional distress in a community sample. Escapism was the strategy most strongly related to current psychological symptoms. Findings also suggested that the greater the initial level of emotional distress, the more likely individuals were to use maladaptive coping, which further exacerbated distress (Aldwin & Revenson, 1987).

Although planful problem-solving and positive reappraisal have been associated with satisfactory outcomes (Folkman et al., 1986) and improved emotional states

(Folkman and Lazarus, 1988), confrontive coping and distancing have been seen to contribute to unsatisfactory outcomes (Folkman et al., 1986) and worsened emotional states (Folkman & Lazarus, 1988). Outcomes and emotional states were measured in relation to a focal stressor the subjects had identified. Similarly, planful problem-solving has been negatively correlated with psychological symptoms, whereas confrontive coping was positively correlated with them (Folkman et al., 1986). Confrontive coping may alienate others through the expression of anger or hostility and prevent the resolution of difficulties, whereas distancing may divert attention from approaching the problem and finding potential solutions, which subsequently may lead to increased distress.

Psychological resources such as personal mastery, self-confidence, and a sense of optimism have been found to correlate with certain types of coping strategies. Personal mastery was found to correlate with problem-focused coping in the area of work and finance, but was unrelated to problem-focused coping in the interpersonal domain. Patients who had low personal mastery scores used more selective ignoring, passive acceptance, resignation, and reward substitution than did those with high mastery scores (Fleishman, 1984). Holahan and Moos (1987) found that patients who are more self-confident used active coping strategies more frequently than avoidance coping strategies.

Optimism has been negatively associated with the use of denial, disengagement and expressing feelings, and positively associated with problem-focused coping, positive reappraisals, and seeking social support. Optimism has also been associated with

acceptance/resignation only, however, when the situation was appraised as uncontrollable (Scheirer, Weintraub, & Carver, 1986).

Although studies are difficult to compare because they differ in measurement procedures, instruments, sample characteristics, and types of stressful events, taken together they appear to suggest that avoidance coping exacerbates psychological and physical symptomatology, whereas approach strategies are related to better physical and mental well-being. Studies examining problem- and emotion-focused coping generally have found that emotion-focused coping increases distress, even though emotion-focused coping is defined as efforts directed at *decreasing* emotional distress. The additional differentiation of emotion engagement (i.e., strategies used to manage emotional reactions) and emotion disengagement (i.e., strategies used to avoid the stressor) may help identify those particular strategies that exacerbate distress and that diminish distress. The generalization that emotion-focused coping only exacerbates distress may misrepresent its effects.

Coping with Chronic Illness and Heart Disease and Its Outcomes

A chronic disease, such as heart disease, extends over time and requires ongoing adjustment. Few studies have examined the coping process in recovery from MI/CABS even though Croog et al. (1968) recommended more than 20 years ago that researchers identify key coping tasks and the relationship between coping and outcome in the recovery and rehabilitation of cardiac patients (Croog et al., 1968). Research on patients

with other chronic illnesses has progressed further. For example, colostomy patients with satisfactory and unsatisfactory adjustment to their disease could be differentiated on the basis of the (1) amount of information known concerning different aspects of the disease, (2) knowledge of appropriate coping resources, including individual coping strategies and social support systems, (3) a problem-solving attitude, including active resourcefulness, flexible and constructive behaviour as opposed to premature resignation and passive helplessness, (4) a sense of personal mastery, and (5) motivation to continue coping with adaptive tasks despite the prolonged nature of the disease (Turk, 1979). Coping, as defined by the patient's perceived ability to cope with multiple sclerosis, was linked with lower anxiety, fewer hospitalizations, and increased knowledge about the disorder (Counte et al., 1983).

In the cardiac literature, research on coping strategies has focused primarily on the mechanism of denial and its relationship to adaptation. Some patients deal with the threat of their cardiac event by denying the seriousness of the illness (Croog et al., 1968). Denial can be based on a need to retain control and suppress anxiety associated with being sick, which can be perceived by some patients as being demeaning or becoming ineffectual (Knapp & Blackwell, 1985). In some studies, the use of denial immediately post-infarction has been shown to decrease anxiety. Cardiac patients in a coronary care unit who used denial as a major coping mode had an increased chance of survival (Hackett et al., 1968). Patients recovering from general surgery in hospital were also found to have lower anxiety and more rapid recovery when an avoidant strategy was

utilized (Cohen & Lazarus, 1973). In contrast, a preference for escape coping among cardiac and non-cardiac patients (e.g., avoidance, denial) was associated with more distress and higher anxiety during the hospital stay (Viney & Westbrook, 1984). The long-term implications of denial are less clear (Croog, 1983). A few studies, however, have found the use of denial was related to long-term resistance to compliance with medical regimens in cardiac patients (Krantz, 1980; Croog, Shapiro, & Levine, 1971) and predicted helplessness and decreases in sociability 7 months post-discharge among a cardiac and non-cardiac patient sample (Viney & Westbrook, 1984). In contrast, deniers in other studies have returned to work earlier, remained employed at one year, resumed sexual activity with less difficulty, and reported fewer physical and psychological symptoms than did non-deniers (Stern et al., 1977; Stern, Pascale, & McLoone, 1976).

A study examining cardiac patients' coping strategies, distress, and physical activity level in hospital, 1 and 4 weeks post-discharge, found that confrontive coping behaviours (i.e., control-oriented coping) were used more frequently than emotive coping (i.e., reactive behaviours) or palliative coping (i.e., passive behaviours). Confrontive and palliative coping did not change over time; however, emotive coping significantly decreased 1 and 4 weeks post-discharge. After discharge, cardiac patients experiencing higher emotional distress used more emotive coping (i.e., getting mad, blaming others) in trying to reduce their distress. Emotional distress was also associated with less use of confrontive coping. However, no relationship was found between physical activity level and coping strategies (Christman, McConnell, Pfeiffer, Webster, Schmitt, & Ries, 1988).

Patients who began to resume activities and deal directly with illness-related problems 2 months after an MI (defined as "active copers") were more active 1 year later compared to patients who were more reticent (Mayou, 1979). However, in this study, coping, defined as resumption of activities, was confounded with outcome.

Patients with cardiovascular problems and/or chest pain more frequently used social support and had lower scores on self-blame compared to other samples (psychiatric patients, those with work problems, and caregivers of Alzheimer patients) (Vitaliano, Maiuro, Russo, Katon, DeWolfe, & Hall, 1990). In another study comparing chest pain patients with and without clinical depression, higher scores on wishful thinking and lower scores on seeking social support were observed among clinically depressed patients, whereas chest pain patients without psychiatric disorders scored higher on problem-focused strategies (Vitaliano, Katon, Mauiro, & Russo, 1989).

In a study comparing MI and cancer patients, no significant differences were found in their use of confrontation, avoidance, or acceptance-resignation coping. Results indicated that cancer and MI patients used more confrontive strategies than did controls (i.e., information seeking, cognitive redefinition of illness, etc.). Use of confrontation was associated with patients who were extroverted and/or who perceived their illness as serious. Greater use of acceptance-resignation coping was associated with longer duration of illness, expression of negative affect, negative self-perception, and less hope regarding recovery. Patients who were of lower socioeconomic status and who expressed more negative self-perception tended to utilize avoidance coping. Patients who were

adjusting well, as assessed by significant others and their physicians, minimized the use of avoidance and acceptance-resignation as coping styles (Feifel, Strack, & Nagy, 1987).

Similarly, in a study comparing hypertensive patients and normotensive patients seeking help for an acute medical problem, hypertensive patients were more likely to use an information-seeking mode of coping than were normotensive patients who tended to use an information-avoidance mode of coping. Hypertensive patients requested medical treatment for stress-related problems more frequently than did normotensives and viewed their stress-related problems as affecting their functioning (Miller, Leinbach, & Brody, 1989).

In a separate study, patients with four chronic illnesses were divided into more controllable (hypertension, diabetes mellitus) and less controllable (rheumatoid arthritis and systemic blood cancers) disease categories (Felton, Revenson, & Hinrichsen, 1984). No significant differences were found between illness groups on the type of coping strategies used. In addition, length of illness did not influence coping strategies employed. However, patients utilizing certain emotion-focused coping strategies (i.e., emotional expression, wish-fulfilling fantasy, and self-blame) had poorer psychological adjustment and were less accepting of their illness whereas patients using cognitive restructuring and information-seeking (i.e., problem-focused coping) had higher positive affect. In a 7-month follow-up of these patients, no significant differences in coping strategies were found between high and low illness controllability. However, patients who relied on wish-fulfilling fantasy had poorer psychological adjustment and were less

accepting of their illness. Information-seeking was related to reduced negative affect. Wish-fulfilling fantasy involves ruminations of what might have been and provides no escape; however, information-seeking improves knowledge regarding the illness and may provide other options for coping with illness-related tasks. In this study, coping was measured in relation to being ill generally and did not examine coping with specific illness-tasks (Felton & Revenson, 1984).

Similar findings have been found with rheumatoid arthritis patients. High scores on the emotion-focused strategies of self-blame, emotional expression, and wish-fulfilling fantasy were related to a decrease in positive affect and an increase in negative affect, whereas high scores on the problem-focused strategy of information-seeking were related to increases in positive affect and decreases in negative affect (Revenson & Felton, 1989). With increased disability, patients relied more on emotion-focused coping strategies in order to divert attention from the illness or to minimize illness related stressors; however, negative affect increased.

Regarding the relationship between coping strategies and social adjustment in patients with chronic illness (i.e., a general rehabilitation sample), Keller (1988) found that patients who used "palliative" coping strategies, defined as avoiding the problem, withdrawing from the situation, and resignation, had higher dysfunctional scores on the Sickness Impact Profile.

In summary, the stress experienced by cardiac patients occurs in the context of the perception and cognitive processing of adaptive demands. How these demands are met

is dependent upon such dispositional characteristics as personal mastery, as well as the coping strategies employed by the individual. Some coping strategies facilitate adjustment in the face of illness-adaptive tasks, whereas others impede adjustment. For example, problem-focused coping may be most effective in situations in which the patient can exert control, yet in less controllable situations emotion-focused coping strategies may be most effective in at least the short-term. Some studies have found that emotion-focused coping increases distress, however whether this is a consequence for both the engagement and disengagement dimensions of this strategy has not been investigated.

Difficulties in comparing and integrating the findings of coping studies are due to variations in definitions of coping, instruments and measurement procedures, and illness populations and sample characteristics. Many studies examining coping have relied on cross-sectional or retrospective designs, clouding the directionality of the relationships between variables. Frequently, measures of coping and adjustment have been confounded making it impossible to disentangle coping from outcomes. Studies on coping among chronic illness samples have treated the illness as a unitary stressor rather than as involving multiple stressors, each of which may pose unique coping demands.

2.3 Conclusion and Rationale

CHD patients are confronted by numerous adjustive demands, and the prevalence of psychological distress among this population is high. Regaining optimal functional capacity involves the interaction of physical, psychological, and social variables. Detailed

knowledge of the process of adaptation specific to MI/CABS, including the identification of the stressors and coping strategies employed over time, is essential for the development of comprehensive rehabilitation programs aimed at helping patients achieve an optimal level of functioning. Prior to implementing interventions designed to enhance coping, the relationships between coping and adjustment in the context of specific stressors must be understood.

Adjustive demands and problems change over time and contexts, for any chronic illness or disability. However, much of the research on coping with chronic illness has been based on perspectives which emphasize stability of responses across situations and not the process of coping as it develops during the course of adaptation to illness or disability (Watson & Kendall, 1983; Turk, 1979; Turk et al., 1980; Lazarus & Folkman, 1984). Three important factors need to be considered when studying coping: time, context, and outcome (physical, psychological, and social) (Cohen & Lazarus, 1979). Generally, the cardiac literature has not studied the coping process over time, nor has it addressed situational specificity and multidimensional outcomes. Specifically, the relationship between adjustive demands and coping, and the influence of coping on multidimensional outcomes (e.g., physical recovery, psychological, and social adjustment), and the inter-relationships between these variables have not been systematically researched. Most of the studies reviewed have suffered from one or more of a variety of conceptual and methodological problems such as inadequate explication of the coping construct, unidimensional measurement of coping, lack of differentiation between coping

processes and outcomes, lack of standardized instruments to measure outcome variables and their predictors, and inadequate follow-up.

This study was designed to examine the impact of cardiac functional capacity, stress, psychological resources (i.e., personal mastery) and coping strategies on psychological and social outcomes in cardiac rehabilitation patients. Given the knowledge gaps identified in this review, the present investigation employed a prospective design to determine predictors of adjustment, defined coping based on the integrated stress and coping model proposed by Lazarus and Folkman (1984) and Tobin et al. (1989), identified the frequency and severity of stressors faced by this population and the strategies used in efforts to cope, utilized objective, standardized measures, and assessed multidimensional outcomes (i.e., psychological and social adjustment) at three time points during recovery and rehabilitation.

3. OBJECTIVES, HYPOTHESES, AND RESEARCH QUESTIONS¹

3.1 Objective 1: Stability of Key Dependent and Independent Variables

To examine the stability of key dependent and independent variables between the three time points during a patient's rehabilitation program² (intake, 3 and 6 months), in order to determine when change occurred.

Research Question 1: To determine whether means differ, across the three time points, on two dependent variables -- psychological distress (as measured by the Brief Symptom Inventory) and social maladjustment (as measured by the Sickness Impact Profile) -- and four independent variables: personal mastery (as measured by the Personal Mastery Questionnaire), cardiac functional capacity (as measured by kilocalorie expenditure³), number of hassles (as measured by the Hassles and Concerns Scale), and coping strategies (as measured by the Coping Strategies Inventory and Symptom Management Scale).

¹Research questions were used to guide investigation whenever an objective was descriptive, or when there was insufficient empirical or theoretical basis upon which to develop clear hypotheses.

²For a description of the cardiac rehabilitation program, see the Methodology section (p. 57).

³Kilocalorie expenditure is an energy measure commonly used as an analogue for cardiac functional capacity.

3.2 Objective 2: Prediction of Outcomes - Psychological Distress and Social Maladjustment

To determine (a) which predictor variables (demographics, personal mastery, cardiac functional capacity, number of hassles, and global coping strategies [i.e., engagement, disengagement, and symptom management]) at intake (*Time 1*) best predict psychological distress and social maladjustment at the end of the 6-month program (*Time 3*); (b) which predictor variables at *Time 1* best predict psychological distress and social maladjustment midway through the program (3 months - *Time 2*); (c) and which predictor variables at *Time 2* best predict psychological distress and social maladjustment at *Time 3*.

The three time points were chosen to coincide with the HIPRC 6-month program. Patients were assessed shortly before entering the program, halfway through, and at the end. Most studies have used pre and post measurement times only. Assessments were carried out at the three time points mentioned in order to provide a more detailed account as to when changes occur, and also to explore the internal replicability of the hypotheses.

Hypothesis 1: (a) The number of hassles experienced and the global coping strategies used at *Time 1* (as measured by the Hassles and Concerns Scale, Coping Strategies Inventory and the Symptom Management Scale, respectively) will contribute significant increments to the variance explained in psychological

distress, as measured by the Brief Symptom Inventory at *Time 3*, over and above the other independent variables at *Time 1* (psychological distress, demographic variables, personal mastery, and cardiac functional capacity, as measured by the Patient Information Sheet, Personal Mastery Questionnaire, and kilocalorie expenditure, respectively); (b) the number of hassles and coping strategies at *Time 1* will contribute a significant increment of the variance explained in psychological distress at *Time 2*, over and above the other *Time 1* independent variables; (c) and the number (frequency) of hassles and coping strategies at *Time 2* will explain a significant increment of the explained variance in psychological distress at *Time 3*, over and above the other *Time 2* independent variables. More specifically, number of hassles and disengagement coping strategies (as measured by the Hassles and Concerns Scale and Coping Strategies Inventory) are hypothesized to have a positive predictive correlation with psychological distress, whereas engagement and symptom management coping strategies (as measured by the Coping Strategies Inventory and the Symptom Management Scale) are expected to have a negative predictive correlation with psychological distress (as measured by the Brief Symptom Inventory).

Hypothesis 2: (a) The number of hassles experienced and the global coping strategies used at *Time 1* (as measured by the Hassles and Concerns Scale, Coping Strategies Inventory and the Symptom Management Scale, respectively) will

contribute significant increments to the variance explained in social maladjustment as measured by the Sickness Impact Profile at *Time 3*, over and above the other independent variables (social maladjustment, demographic variables, personal mastery, and cardiac functional capacity, as measured by the SIP, Patient Information Sheet, Personal Mastery Questionnaire, and kilocalorie expenditure, respectively) at *Time 1*; (b) the number of hassles and global coping strategies at *Time 1* will contribute a significant increment to the variance explained in social maladjustment at *Time 2* over and above the other *Time 1* independent variables; and (c) the number of hassles and coping strategies at *Time 2* will account for a significant increment to the variance explained in social maladjustment at *Time 3*, over and above the other *Time 2* independent variables. More specifically, number of hassles and disengagement coping strategies (as measured by the Hassles and Concerns Scale and Coping Strategies Inventory) are hypothesized to have a positive predictive correlation with social maladjustment, whereas engagement and symptom management coping strategies (as measured by the Coping Strategies Inventory and the Symptom Management Scale) will have a negative predictive correlation with social maladjustment (as measured by the Sickness Impact Profile⁴).

⁴Higher scores signify a reduction in activity and thus a poorer outcome.

3.3 Objective 3: Relationship Between Specific Coping Strategies and Outcome Variables

To determine whether certain specific types of coping strategies have statistically significant zero-order concurrent and predictive correlations with psychological distress and social maladjustment at the three time points during the rehabilitation program (intake, 3 and 6 months). Coping strategies were measured at the three time points in order to examine change in strategies used over the course of the program. Measurement of coping at the three time points also provided a means of testing the replicability of hypotheses.

Research Question 2: To describe the zero-order correlational relationship between specific coping strategies (as measured by the primary, secondary, and tertiary levels of the Coping Strategies Inventory and Symptom Management Scale) and psychological distress and social maladjustment at each time point.

3.4 Objective 4: Description of Stressors (Hassles)

To identify the frequency, severity, and intensity of stressors experienced by cardiac patients at the three key time points in their rehabilitation program (intake, 3 and 6 months).

Research Question 3: To describe the number (frequency), severity and intensity of stressors experienced by patients, as measured by the Hassles and Concerns Scale, at each time point.

3.5 Objective 5: Description of Coping Strategies

To identify the coping strategies used to deal with cardiac and noncardiac focal stressors at the three time points (intake, 3 and 6 months).

Research Question 4: To report the percentage of cardiac and non-cardiac focal stressors identified by patients, the coping strategies used to deal with each of these types of stressors, and to determine the mean engagement and disengagement coping strategy scores relevant to these stressors (as measured by the tertiary scales of the Coping Strategies Inventory), at intake, 3, and 6 months.

3.6 Objective 6: Effects of Program Participation on Personal Mastery, Kilocalorie Expenditure, Number of Hassles, and Coping Variables

To examine the impact of participation in the cardiac rehabilitation program on personal mastery, kilocalorie expenditure, number of hassles, and coping strategies, all of which are presumed to have an impact on adjustment.

Research Question 5: To determine whether program participation (as measured by the total number of HIPRC program sessions attended by the end of the program) predicts change in each of the following variables at *Time 3*: personal mastery (as measured by the Personal Mastery Questionnaire), cardiac functional capacity (as measured by kilocalorie expenditure), number of hassles (as measured by the Hassles and Concerns Scale), and coping strategies (as measured by the Coping Strategies Inventory, and Symptom Management Scale), while controlling for key indicators of the patient's status at program intake (i.e., demographics, personal mastery etc.).

4. METHODOLOGY

4.1 Subjects and Sample

4.1.1 Research Setting

The Heart Institute Prevention and Rehabilitation Centre (HIPRC) at the University of Ottawa Heart Institute delivers service to individuals with CHD and their families. It is a medically supervised program to which patients are referred by their family doctor, cardiologist, or surgeon. Individuals attend the program for 6 months during which they progress through an individualized rehabilitation program. The range of services available includes: physical medicine, nursing (health education), physiotherapy (exercise conditioning), vocational counselling, social work, psychology, occupational therapy, and dietetics. The proportions of this sample receiving these services is broken down as follows: 68% physical medicine, 95% nursing, 97% physiotherapy, 22% vocational counselling, 15% social work, 21% psychology, 13% occupational therapy, and 47% dietetics.

4.1.2 Research Sample⁵

The subjects in this study were male participants in the cardiac rehabilitation program at the HIPRC. Patients were recruited sequentially during regular weekly assessments ("clinic") if they satisfied all of the following inclusion and exclusion criteria: male; between the ages of 25 and 66; diagnosed as having had a cardiac event in the last two years (documented myocardial infarction, coronary artery graft surgery, heart transplant, valve repair/replacement surgery, or diagnosed coronary artery disease); able to understand and read English; and no other complication in their medical status that would prevent full participation in the HIPRC program, as determined by the team physiatrist. All patients referred to the HIPRC were evaluated on the basis of the above inclusion/exclusion criteria.

From June 17, 1988, to June 30, 1989, there were 429 referrals. Of these, 178 (41%) did not meet the criteria for the following reasons: 70 were female; 17 could not read English; 44 were over 66 years of age; 5 were receiving health services outside the HIPRC; 30 had not had a cardiac event in the past two years; 5 had a complicated medical status, which prevented them from participating fully at HIPRC; 3 were referred for short-term treatment only (3 months); and 4 were not interested in the HIPRC

⁵For this study, power was considered in relation to the regression analyses because it is a maximization procedure which may capitalize on chance. Stevens (1986) and Tabachnick and Fidell (1989) suggest that between 15 and 20 times more cases than independent variables (IVs) are required for a reliable regression equation. The number of IVs in the regression equations ranged between 10 and 12. Following the above, an acceptable sample size would be between 150 (10 IVs x 15 subjects) to 240 (12 IVs x 20 subjects). The number of cases in the regression analyses reported here ranged between 158 and 185. This indicates that the analyses would have adequate power. The only exception to the proceeding occurred with the regressions involving a subsample of employed patients where the number of cases ranged between 56 and 87. However, this still exceeded the bare minimum requirement of at least 5 times more cases than independent variables suggested by Tabachnick and Fidell (1989).

program after having completed the intake assessment. Of the 251 patients who met the criteria, 223 (89%) agreed to participate in this longitudinal study and a total of 215 (86%) actually did so. Ten of the 223 patients who had agreed to take part in the research did not complete the *Time 1* questionnaires; of these, eight dropped out of the study completely (see "Procedure"). Those who declined to participate gave lack of time or interest as reasons.

The research sample at *Time 1* comprised 213 subjects. They were predominantly married (89%) and ranged in age from 27 to 66 with a mean age of 54 ($SD = 9$ years). The current cardiac diagnoses of the sample were coronary artery bypass graft (CABS) (47%), myocardial infarction (MI) (25%), angioplasty (12%), angina (8%), valve surgery (6%), transplant (1.5%), and permanent pacemaker (0.5%). The average length of time since the most recent cardiac event had occurred was 5 months (*median* = 4 months; range = 1 to 24 months). Seventy-six percent had a previous history of a cardiac event. Regarding educational attainment, 14% had completed grade school only, 34% high school, 16% technical college, and 36% university. Only 42% of the sample were employed at *Time 1*, with 31% on disability or sick leave, 4% unemployed, and 23% retired.

4.2 Procedure

Patients who were eligible for the research, after the application of the inclusion and exclusion criteria, received information about the purpose of the study. Those

agreeing to participate were asked to sign a statement of informed consent (see Appendix A-1) that had been approved by the Research Ethics Committee of the Ottawa Civic Hospital. They were given the initial questionnaire package (*Time 1*) to complete at home and asked to return it within one week, either in person or through the mail.

Subsequent questionnaire packages were mailed 3 (*Time 2*) and 6 months (*Time 3*) after subjects began the rehabilitation program. A questionnaire for spouses of the married patients' was also included in the *Time 3* package. A standard follow-up procedure was used with each patient to maximize the response rate. Four days after each package of questionnaires had been sent, a postcard was mailed to each patient as a reminder to complete the questionnaires. If the package had not been returned within 1 week after the postcard had been sent, the patient was telephoned. Before patients were considered to be dropouts at a given time point, weekly telephone calls, for a maximum of 4 weeks, were made to remind patients to complete the questionnaires and to answer possible questions. If patients did not return the questionnaires for a particular time point but wished to remain in the study, questionnaire packages were mailed to them at the next data-gathering occasion. When questionnaires were incomplete, patients were contacted by telephone and the items were answered, or the questionnaires were returned for the patient to complete.

Cardiac functional capacity (kilocalorie expenditure) was calculated from the HIPRC physiotherapy exercise class forms completed by all patients at each exercise class. Patients' participation in and attendance at different service components (e.g.,

physiotherapy, nursing, social work, etc.) of the HIPRC cardiac rehabilitation program were monitored with attendance forms that patients completed at their twice-weekly physiotherapy exercise class. Patients who did not participate in an exercise class were contacted by telephone in order to tabulate their attendance at other services. To ensure the accuracy of the information, program attendance was verified with staff progress notes in HIPRC charts.

The response rate for returned questionnaire packages at *Time 1* was 96% ($\underline{n} = 213/223$), 89% for *Time 2* ($\underline{n} = 199$), and 85% for *Time 3* ($\underline{n} = 190$) (see Table C-1 in Appendix C for response rates for the individual questionnaires). The spouse questionnaire was sent only to the spouses of patients who had completed *Time 2* questionnaires ($\underline{n} = 179$). The response rate for the spouses was 82% ($\underline{n} = 164$). In total, 37 patients (17%) had incomplete data over the three time points; however, only 8 of these had dropped out immediately after recruitment⁶. Partial data were available on the remaining 29 patients: 13 patients completed *Time 1* questionnaires only; 1 completed *Time 2* questionnaires only; 11 patients completed *Time 1* and *Time 2* questionnaires only; 3 completed *Time 1* and *Time 3* questionnaires only; and 1 completed *Time 2* and *Time 3* questionnaires only.

At the three time points, all patients were assessed with the following instruments: (1) a demographic information form (see Appendix B-1, B-2, B-3); (2) the Personal

⁶Information regarding patients' age and diagnosis was obtained during HIPRC intake assessments. Patients also completed the Brief Symptom Inventory at the same time that eligibility was determined, prior to being given the first questionnaire package.

Mastery Questionnaire (Pearlin & Schooler, 1978), to assess personal mastery (see Appendix B-4); (3) the Hassles and Concerns Scale (adapted from the Hassles Scale; Kanner et al., 1981), to assess the frequency, severity, and intensity of stressors (see Appendix B-5); (4) a structured protocol to elicit information about a focal stressor the patient may have experienced during the previous week, and the primary and secondary cognitive appraisals associated with this focal stressor (taken from the Stress Interview, Folkman et al., 1986) (see Appendix B-6, Parts 1-3); (5) the Coping Strategies Inventory (CSI; Tobin, Holroyd, & Reynolds, 1984) to assess covert and overt strategies used to cope with the focal stressor (see Appendix B-6, Part 4); (6) the Symptom Management Scale (SMS; Latack, 1986) to measure emotional-physical coping strategies (see Appendix B-7); (7) the Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982), to measure psychological adjustment (see Appendix B-8); and (8) four subscales from the Sickness Impact Profile--home management, social interaction, recreation and pastime, and work (SIP; Bergner, Bobbitt, Carter, & Gilson, 1981) to assess patient's social adjustment (see Appendix B-9). Each questionnaire package required approximately 1.5 hours to complete.

As a validity check, patients' spouses completed the Sickness Impact Profile-Spouse Version, the only modification to which was changing the personal pronoun "I" to "He" on the items (SIP-S; modified SIP; see Appendix B-10). Thus the spouse was instructed to answer questions regarding the patient's social adjustment at the end of the program (see Appendix F for intraclass correlations). This questionnaire required

approximately 15 minutes to complete (see Appendix A-2 for the consent form), which had also been approved by the Research Ethics Committee of the Ottawa Civic Hospital.

The questionnaires were piloted on 10 cardiac rehabilitation patients to ensure they were understandable and acceptable to subjects. Required revisions to the wording of instructions were undertaken prior to recruitment of the research sample. Data collection began June 1, 1988 and was completed 20 months later, in January, 1990.

4.3 Variables and Measures⁷

4.3.1 Cardiac Functional Capacity

Patients' cardiac functional capacity was measured by calculating their kilocalorie expenditure during physiotherapy exercise classes. This is a measure commonly used in rehabilitation medicine as an indicator of cardiac functional capacity. At the HIPRC, each patient's initial exercise level is routinely assessed prior to beginning the program. From this, a metabolic equivalents (MET⁸) score is estimated, and the patient is assigned to an exercise class that is commensurate with his or her level of capacity. The patient's exercise output can be expressed in terms of kilocalorie expenditure. The

⁷In order to minimize confounding among measures, items were purged from one measure if they were similar to items in another. For details on item purging, see Appendix D. The internal consistency for each scale was calculated before and after item purging (see Appendix E).

⁸The MET score is the basic metabolic unit used for this estimation. One MET is the amount of oxygen required by a person who is sitting at rest (Brammell, 1981).

following formula was used to calculate kilocalorie expenditure (American College of Sports Medicine, 1986).

$$\text{kcal} = 3.5 \times \text{METS} \times .001 \times 5 \times \text{kg} \times \text{minutes exercised}$$

Each patient's HIPRC program includes of exercising for a specified amount of time at a certain MET level. Each week, the amount of exercise patients undertake is modified based on their level of capacity and potential for exertion.

4.3.2 Personal Mastery

Personal mastery was measured with Pearlin and Schooler's (1978) 7-item scale. It assesses the extent to which a subject regards his/her life chances as being under his/her control in contrast to being fatalistically determined. Subjects respond on a 4-point Likert scale, indicating whether they agree or disagree with each statement (see Appendix B-4). The internal consistency (Cronbach's alpha) of this scale was reported by Turner et al. (1983) to be .71, by Folkman et al. (1986) to be .75, and by Waltz (1986) to be .82. Regarding predictive validity, the scale has been found to predict negative affect and perceived disability in cardiac patients. Cardiac patients with low personal mastery experienced more psychological distress and higher perceived disability (Waltz, 1986). Personal mastery has also been found to be negatively associated with psychological symptoms in a community sample (Folkman et al., 1986). In terms of

concurrent validity, personal mastery has been found to be negatively correlated with feelings of low self-worth and self-denigration (as measured by Rosenberg's Self-derogation scale) (Waltz, 1986) and with psychological symptoms (Folkman, et al., 1986). In the current study the internal consistency was .73 (see Appendix E for detailed table).

4.3.3 Stress

Patients' chronic stress was assessed with the Hassles and Concerns Scale (HCS; see Appendix B-5), which was adapted from the 117-item Hassles Scale of Kanner et al. (1981). The content validity of the adaptation was established by having six judges independently evaluate which items in the original scale were relevant to cardiac patients. The judges consisted of individuals who worked in the area of cardiac rehabilitation (a physiatrist, three rehabilitation psychologists, a cardiac nurse, and the investigator). Forty-three items were either removed or, if the content was similar combined, (eg., "Not enough money for clothing", "Not enough money for food", etc., were combined into "Concerns about not having enough for basic necessities (i.e., clothing, food etc)". Twenty-two items pertaining specifically to cardiac symptoms (eg., chest pain [angina], arrhythmias, shortness of breath, fatigue, heart palpitations, etc.) were added.

The inclusion of an item in the revised scale was based on having a minimum of 4 out of the 6 judges' agree that the item was pertinent to the situation of cardiac patients. The revised measure comprised 96 items, all of which tap annoying daily problems or

concerns in the areas of work, time pressures, future security, household demands, financial responsibilities, family problems, personal concerns, and general and cardiac health. The final version was piloted on a sample of cardiac patients as a face-validity check; no further revisions were necessary.

The revised scale has a dual response-option format. First, patients check whether a hassle or concern has been experienced during the last month. Second, they indicate its severity on a 5-point Likert scale, ranging from "not at all stressful" to "extremely stressful". The original 3-point Likert scale was changed to include the possibility of having experienced a particular hassle or concern without necessarily finding it stressful. This modification was made to diminish the confounding of hassles with symptoms of psychological distress. This met the criticism of Dohrenwend and Shrout (1985) who had pointed out that in order to check a hassle it needed to be experienced as at least "somewhat severe"—which would described only subjects who were experiencing distress. The response format on the revised scale corresponds to the original definition of hassles (i.e., irritants that can range from minor annoyances to major pressures). Patients can experience a concern or hassle and not find it stressful or else find it only slightly stressful.

Three summary scores are generated: frequency, cumulative severity and intensity. The frequency score is simply the number of items checked. Cumulative severity represents the sum of the 5-point ratings, and the intensity score is calculated by dividing the cumulative severity score by the frequency score. The intensity score is an

index of how intensely the average concern checked was experienced, regardless of the number of items checked.

Regarding construct validity, the frequency of "hassles" has been associated with psychological symptoms (Kanner et al., 1981) and with poorer overall health status, higher levels of somatic symptoms, and lower energy level (DeLongis et al., 1982). With regard to predictive validity, the frequency of "hassles" has been found to be a better predictor of psychological symptoms (Kanner et al., 1981) and occurrence of tension headaches than measures of life events (Holm et al., 1986). Regarding discriminant validity, the Hassles Scale has been found to differentiate between headache-sufferers and headache-free controls (Holm et al., 1986).

In this study, the revised version of the 96-item scale had an internal consistency of .94. After the removal of 11 confounded items, the internal consistency was .93 for the 85 remaining items (see Appendix E). For more details on purging of items, see Appendix D.

4.3.4 Focal Stressors and Cognitive Appraisals

Patients were asked to identify and describe the most stressful focal event that had occurred in the past week (see Appendix B-6, Part 1). The patients' primary and secondary appraisals of this event were then identified. Primary appraisals are judgments about what is at stake in a specific encounter, secondary appraisals are judgments about which coping options are available. These appraisals of the stressor were assessed using

questions taken from the Stress Interview (Folkman et al., 1986). From nine possible primary appraisals (see Appendix B-6, Part 2), the subject indicated on a 5-point Likert scale the reasons why the event was viewed as stressful. Secondary appraisal was measured with 4 items on which the subject indicated, on a 5-point Likert scale, the coping options available in that particular situation (see Appendix B-6, Part 3). These data were not utilized because they were not directly relevant to the objectives of the thesis; the information was collected for purposes of future research.

4.3.5 Coping Strategies

Coping strategies employed in response to the specific focal stressor mentioned earlier were assessed with the Coping Strategies Inventory (CSI; Tobin et al., 1984). That is, patients were asked to complete the CSI in relation to this focal stressor (see Appendix B-6, Part 4).

The CSI has 14 subscales, including 8 9-item primary scales (for a total of 72 items), 4 secondary scales (composed of the 8 primary scales), and 2 tertiary scales (made up of the 4 secondary scales). The hierarchical structure of the CSI was presented earlier in Figure 1.

The primary subscales consist of specific coping strategies used in dealing with a stressful event: problem-solving, cognitive-restructuring, social-support, expression of emotions, problem-avoidance, wishful-thinking, social-withdrawal, and self-criticism. The secondary subscales consist of problem-focused and emotion-focused engagement and,

problem-focused and emotion-focused disengagement. The tertiary subscales consist of engagement and disengagement. Cronbach's alpha coefficient for the primary scales of the CSI ranges from .71 to .94; for the secondary scales, from .81 to .92; and, for the tertiary scales, alpha is .89 and .90 (Tobin et al., 1984). The Pearson correlations for a two week test-retest (with subjects responding to the same stressful situation) range from .67 to .83 (Tobin et al., 1984). In the present study, Cronbach's alphas for the tertiary scales were .92 for engagement and .91 for disengagement (see Appendix E).

Regarding discriminant validity, the CSI has successfully differentiated depressed from nondepressed samples (Tobin, Holroyd, Reynolds, & Wigal, 1985, cited in Tobin et al., 1984), headache from nonheadache sufferers (Holroyd, Tobin, Rogers, Hursey, Penzien, & Holm, 1983, cited in Tobin et al., 1984), and neurotic from normal samples (Tobin, Holroyd, & Reynolds, 1982, cited in Tobin et al., 1984). Criterion validity for the CSI has also been reported: the CSI is predictive of depressive symptoms for individuals under high levels of stress (Tobin, Holroyd, & Reynolds, 1983, cited in Tobin et al., 1984). Construct validity of the CSI has also been assessed through examination of the factor structure of the CSI; such analyses support the hierarchical relationship hypothesized to exist among the proposed subscales (Tobin et al., 1984). A principal components analysis performed as part of the present study provided further support for the hierarchical factor structure of this scale: the primary coping strategies making up the engagement and disengagement factors were found to be identical to the two-factor structure proposed by Tobin et al. (1984) (see Appendix G).

The Symptom Management Scale (SMS; Latack, 1986) consists of emotional-physical coping strategies such as relaxation and exercise, that patients use to manage stress-related symptoms on a global level (see Appendix B-7). These types of strategies are an integral part of the HIPRC program components and were considered an important companion measure to the CSI. Of the original 24 items comprising the SMS, 7 were removed because their content overlapped items on the Brief Symptom Inventory (BSI) measure. The internal consistency of the original 24 items was .70 (Latack, 1986). Regarding construct validity, the SMS has been found to be positively correlated with higher stress levels and psychosomatic symptoms (Latack, 1986). The Cronbach's alpha for the 17-item version used with this sample was .65. An additional 3 items were removed to improve internal consistency (see Appendix D); for the final version (14 items) alpha was .69 (see Appendix E).

4.3.6 Psychological Distress

Psychological distress was evaluated with the Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982). This is a 53-item self-report symptom inventory, with 9 primary symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. There are three summary indices: the global severity index (GSI), the positive symptom distress index (PSDI), and the positive symptom total (PST). The summary indices are global measures of psychological distress (see Appendix B-8).

The psychometric characteristics of the instrument are well established. The BSI has demonstrated high internal consistency and high test-retest reliability for each of the nine dimensions. Cronbach's alpha has ranged between .71 and .85. Test-retest reliability coefficients have ranged between .68 to .91 (Derogatis & Spencer, 1982). The global indices have shown high test-retest coefficients, from .80 to .90. Regarding convergent validity, the BSI has been found to be highly correlated with the appropriate MMPI clinical scales. With regard to predictive validity, the BSI has been found to predict psychological distress among chronic pain patients (Derogatis & Spencer, 1982). Derogatis and Spencer (1982) suggest that the GSI provides the single most sensitive indicator of the respondent's overall level of psychological distress. Another reason why the GSI was the only score used in the data analyses is that the items comprising the 9 clinical subscales do not load on the subscales as they have been constructed (Boulet & Boss, in press). The somatization subscale was removed because it was confounded with the Hassles and Concerns Scale due to its items pertaining to cardiac symptoms (see Appendix D for details on item purging). For this sample, the Cronbach's alpha for the unconfounded version (41 items) was .90 (see Appendix E).

4.3.7 Social Maladjustment

Social maladjustment was measured using the Sickness Impact Profile (SIP; Bergner, 1978). The SIP assesses the impact of illness on daily activities and behaviour. A high score represents increased dysfunction. The questionnaire has 136 items, grouped

into 12 subscales. Only the four subscales measuring social domains were used in the present study: home management, social interaction, work, and recreation and pastimes. The home management subscale measures deterioration in the ability to manage domestic tasks; the social interaction subscale measures difficulties in communication and reduced social interaction and activity; the work, and the recreation and pastimes subscales examine reduced frequency of activity in these areas. The SIP was also modified in this research, to permit wives to rate their husband's social adjustment (at *Time 3* only). The SIP asks respondents to check whether a change in an activity has been experienced due to a health condition (see Appendices B-9 and B-10).

The internal consistency (Cronbach's alpha) for the entire SIP (136 items) ranges between .81 and .94; test-retest reliability, from .87 to .97 (Bergner et al., 1981). In terms of concurrent validity, the SIP has been found to correlate well with self-assessed limitations (r ranges between .48 and .74), self-assessed level of sickness (r ranges between .38 and .67), clinician's assessment of limitation (r ranges between .49 and .50), clinician's assessment of sickness (r ranges between .30 and .40), and the National Health Interview Survey questions on activity limitation (r ranges between .57 and .60) (Bergner et al., 1981). In the present study, after item purging, alpha for the subscale of home management was .70 (10 items), for social interaction, .76 (9 items), and for work, .73 (7 items). The recreation and pastimes subscale was entirely removed due to problems of confounding and was thus not used for any analyses.

5. RESULTS⁹

5.1 Pre-analysis Comparisons

At each time point, patients who dropped out were compared to remaining participants on the demographic variables, personal mastery, number of hassles, engagement, disengagement and symptom management coping, psychological distress, and social maladjustment (SIP subscales of home management and social interaction) (see Table C-1 in Appendix C). Comparisons were also made between employed dropouts and employed participants on the variables listed above, with the addition of the SIP work subscale.

5.1.1 Comparing drop-outs and participants

No significant differences were found between dropouts and participants on the *Time 1* variables¹⁰: age, psychological distress (see Table 1) or current diagnosis (see Table 2).

⁹The number of cases varied between analyses because patients who had not completed all questionnaires were kept in order to maximize the number of cases in the multivariate analyses. Mean substitution of independent variables was used in the regression analyses.

¹⁰Information regarding diagnosis and age were obtained during HIPRC intake assessments. Patients also completed the BSI at the same time that eligibility was determined, prior to being given the first questionnaire package.

Table 1

Descriptive Data and Significance Tests^a Comparing Drop-outs and Participants at the Three Time Points.

Variable	Time 1			Time 2			Time 3		
	Dropouts n=10	Participants n=213	t ^b	Dropouts n=24	Participants n=199	t	Dropouts n=33	Participants n=190	t
Age (df) ^c			-.53 (221)			-1.54 (211)			-1.19 (211)
M	52.20	53.68		50.50	53.93		51.71	53.93	
SD	9.99	8.59		8.06	8.60		9.12	8.51	
Personal mastery (df)						-1.05 (211)			-.23 (211)
M				26.50	27.97		27.63	27.89	
SD				5.05	5.44		5.46	5.42	
Number of hassles (df)						.84 (211)			-.13 (211)
M				26.25	23.24		23.13	23.51	
SD				11.31	13.93		12.60	13.92	
Coping strategies: Engagement (df)						1.31 (193)			.89 (193)
M				54.00	43.58		49.38	43.65	
SD									
Disengagement (df)						1.73 (193)			.85 (193)
M				42.90	30.37		35.56	30.60	
SD				24.97	22.21		24.38	22.31	
Symptom management (df)						-.68 (211)			-1.14 (211)
M				5.88	6.40		5.71	6.44	
SD				2.66	2.97		2.81	2.96	
Psychological distress (df)			-.08 (218)			1.26 (218)			.76 (218)
M	55.72	55.95		57.90	55.71		56.92	55.77	
SD	8.25	7.90		6.90	7.98		7.97	7.89	
Social maladjustment subscales:									
Home management (df)						.60 (211)			.28 (211)
M				2.63	2.43		2.46	2.34	
SD				1.78	1.87		1.72	1.88	
Social interaction (df)						.88 (211)			.31 (211)
M				2.13	1.69		1.83	1.70	
SD				2.24	1.90		2.39	1.87	
Hotelling's T ²				.05			.02		
F				.97			.44		
(df)				(9,183)			(9,183)		

^a Following Hotelling's T², t-tests were conducted to determine the variables on which dropouts and participants may have differed.

^b All t-tests are based on pooled variances; *p* corresponds to a two-tailed test of significance. For all tests shown here, *p* > .12.

^c *df* varies due to missing data on measures.

* *p* < .05 ** *p* < .01 *** *p* < .001

Table 2

Descriptive Data and Significance Tests^a on Time 1 Demographic Variables for Dropouts and Participants at the Three Time Points

Time 1	Time 1				Time 2				Time 3							
Variable	Dropouts n ^b =10	%	Participants n=213	%	χ^2	Dropouts n=24	%	Participants n=199	%	χ^2	Dropouts n=33	%	Participants n=190	%	χ^2	
Marital status (df)										4.94 (2)					3.32 (2)	
Single					1	6	10	5				3	13	8	4	
Married					12	75	177	90				19	79	170	90	
Separated/divorced					3	19	10	5				2	8	11	6	
					16		197					24		189		
Educational level (df)											8.64* (3)					7.26 (2)
Grade school					6	38	23	12				7	29	22	12	
High school					3	19	70	36				4	17	69	37	
Technical college					2	13	31	16				4	17	29	15	
University					5	31	72	37				9	38	68	36	
					16		196					24		188		
Employment status (df)											2.15 (3)					6.59 (3)
Employed					9	56	80	41				11	46	78	41	
Unemployed					1	6	7	4				3	13	5	3	
Retired					3	19	47	24				5	21	45	24	
Disability/sick leave					3	19	63	32				5	21	61	32	
					16		197					24		189		
Current diagnosis (df)					8.83 (6)						10.15 (6)					7.42 (6)
Angina	3	30	16	8		4	17	15	8			4	12	15	8	
Angioplasty	1	10	25	12		2	8	24	12			3	9	23	12	
MI ^c	4	40	54	25		11	46	47	23			14	43	44	23	
CABG ^d	2	20	101	47		7	29	96	48			11	33	92	48	
Valve surgery	0	0	13	6		0	0	13	7			1	3	12	6	
Transplant	0	0	3	1		0	0	3	1			0	0	3	2	
Pacemaker	0	0	1	1		0	0	1	1			0	0	1	1	
	10		213			24		199				33		190		

^a With cell sizes less than 5, Yates correction was applied.^b The number of cases differed at the 3 time points due to missing data.^c Myocardial infarction.^d Coronary artery bypass graft.* $p < .05$ ** $p < .01$ *** $p < .001$.

Patients who dropped out prior to *Time 2* were compared to participants at *Time 2* on the *Time 1* measures. No significant differences were found on age, personal mastery, number of hassles, engagement, disengagement and symptom management coping, psychological distress, and social maladjustment (SIP subscales of home management and social interaction), either as a group of variables or individually, as shown in Table 1. Similarly no differences were found between patients who dropped out prior to *Time 3* and participants on *Time 1* variables either as a group, or individually, as shown in Table 1.

Patients who dropped out prior to *Time 2* or *Time 3* were compared to participants on the *Time 1* demographic variables. There were no significant differences between dropouts and participants at *Time 2* on marital status, employment status, and current diagnosis. However, the two groups differed on educational level, with dropouts being more likely to have a lower educational level than participants (see Table 2). No differences were found on *Time 1* variables between patients who dropped out prior to *Time 3* and participants: marital status, educational level, employment status, and current diagnosis (see Table 2).

5.1.2 Comparing employed dropouts and employed participants

Patients who were employed at *Time 1* ($n = 89$) were examined as a subsample because only they completed the SIP work subscale. When employed patients who dropped out prior to *Time 2* ($n = 9$) were compared to employed participants ($n = 80$)

on *Time 1* measures, no significant differences emerged for age, personal mastery, number of hassles, engagement, disengagement, and symptom management coping, psychological distress, and social maladjustment (SIP subscales of home management, social interaction, and work), either on the variables as a group or taken individually, as shown in Table 3. No differences were found between employed dropouts at *Time 3* ($n = 11$) and employed participants ($n = 78$) on the group of *Time 1* variables, or on the variables individually, as shown in Table 3.

Patients employed at *Time 1* who dropped out prior to *Time 2* or *Time 3* were compared to employed participants on *Time 1* demographic variables (see Table 4). There were no significant differences between employed dropouts and employed participants at *Time 2* on marital status, educational level, and current diagnosis. No differences were found between employed dropouts at *Time 3* and employed participants on the *Time 1* variables of marital status, educational level, or current diagnosis.

In summary, even after attrition, the virtual absence of differences between dropouts and participants indicates that the representativeness of the sample was preserved.

Table 3

Descriptive Data and Significance Tests^a Comparing Employed Drop-outs and Employed Participants at Times 2 and 3.

Time 1 Variable	Time 2		t^b	Time 3		t
	Employed Dropouts n=9	Employed Participants n=80		Employed Dropouts n=11	Employed Participants n=78	
Age (df ^c)			-.63 (87)			-.28 (87)
M	49.89	51.60		50.82	51.51	
SD	7.87	7.65		7.80	7.67	
Personal mastery (df)			-.68 (87)			.24 (87)
M	27.22	28.50		28.73	28.32	
SD	5.09	5.37		5.26	5.37	
Number of hassles (df)			.67 (87)			-.48 (87)
M	26.22	22.93		21.36	23.53	
SD	8.21	14.55		11.57	14.40	
Coping strategies: Engagement (df)			.70 (78)			1.01 (78)
M	55.83	48.08		58.14	47.75	
SD	32.69	25.68		22.70	26.36	
Disengagement (df)			1.17 (78)			.65 (78)
M	40.00	29.42		35.29	29.73	
SD	18.83	21.51		23.82	21.27	
Symptom management (df)			.73 (87)			.03 (87)
M	7.22	6.44		6.55	6.51	
SD	2.73	3.11		3.30	3.06	
Psychological distress (df)			.62 (86)			-.48 (86)
M	58.01	56.22		55.28	56.57	
SD	6.01	8.43		7.39	8.35	
Social maladjustment subscales:						
Home management (df)			.21 (87)			-.19 (87)
M	2.11	1.99		1.91	2.01	
SD	1.27	1.75		1.38	1.75	
Social interaction (df)			.04 (87)			-.18 (87)
M	1.67	1.64		1.55	1.65	
SD	1.41	1.93		2.02	1.91	
Work (df)			2.37 (87)			1.23 (87)
M	3.67	2.06		2.91	2.13	
SD	2.35	1.88		1.81	1.99	
Hotelling's T^2		.14			.10	
F		.95			.66	
(df)		(10,68)			(10,68)	

^a Following Hotelling's T^2 , t-tests were conducted to determine the variables on which dropouts and participants may have differed.

^b All t-tests are based on pooled variances; p corresponds to a two-tailed test of significance ($\alpha=.05$) with Bonferroni alpha correction.

^c df varies due to missing data on measures.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 4

Descriptive Data and Significance Tests^a for Time 1 Demographic Variables for Employed Dropouts and Employed Participants at Times 2 and 3.

Variable	Time 2			Time 3		
	Employed Dropouts n=9	%	Employed Participants n=80	Employed Dropouts n=11	%	Employed Participants n=78
Marital status (df)						
Single	1	11	2	1	9	2
Married	6	67	72	10	91	68
Separated/divorced	2	22	6	0	--	8
			7			10
	9		80	11		78
						2.36 (2)
Educational level (df)						
Grade school	3	33	13	2	18	14
High school	1	11	27	1	9	27
Technical college	1	11	10	3	27	35
University	4	45	30	5	46	10
			37			37
	9		80	11		78
						4.43 (3)
Current diagnosis (df)						
Angina	1	11	11			
Angioplasty	1	11	8	0	--	12
MI	5	56	25	2	18	7
CABG ^c	2	22	33	5	46	25
Valve surgery	0		3	3	27	32
			4	1	9	41
	9		80			2
						3
						4.70 (4)

^a With cell sizes less than 5, Yates correction was applied.

^b MI = Myocardial infarction.

^c CABG = Coronary artery bypass graft.

* $p < .05$ ** $p < .01$ *** $p < .001$

5.2 Objective 1: Stability of Key Dependent and Independent Variables

5.2.1 Research Question 1: Mean differences across time points among the variables

The stability of the key dependent and independent variables was examined with Hotelling's T^2 across the three time points. Pairwise comparisons of means over time (i.e., between *Time 1* and *Time 2*; *Time 2* and *Time 3*; and *Time 1* and *Time 3*) were conducted using the Bonferroni correction ($\alpha = .05 / 3 = .017$; Maxwell, 1980) in order to determine where differences occurred. As shown in Table 5 and in Figures 2 to 8, personal mastery scores remained stable over the 3 time points, while kilocalorie expenditure increased significantly between the three time points. Number of hassles significantly decreased between the beginning and middle of the program and between the beginning and end of the program. No significant decrease was observed between the middle of the program to the end. Engagement and symptom management coping remained stable over the three time points; disengagement coping, however decreased significantly between the beginning and the middle of the program and between the beginning and the end of the program. Psychological distress significantly decreased between intake and the end of the program. Regarding the three social maladjustment subscales, home management scores, and social interaction scores significantly decreased (i.e., social maladjustment on these two dimensions declined) from the beginning to the

Table 5

Stability^a of Key Dependent and Independent Variables over Time.

Variable	Pairwise Comparison of Means ^b			<i>n</i>	<i>M</i>	<i>SD</i>
	Time 1	Time 2	Time 3			
Personal mastery Hotelling's $T^2 = .11$ $F_{(2,138)} = .05$						
Time 1	--			140	27.66	5.40
Time 2	-.30	--		140	27.76	5.34
Time 3	-.31	-.05	--	140	27.78	5.57
Kilocalorie expenditure Hotelling's $T^2 = 86.83$ $F_{(2,103)} = 43.00^{***}$						
Time 1	--			105	126.94	34.75
Time 2	-8.60**	--		105	156.18	48.07
Time 3	-8.39**	-3.46*	--	105	170.45	57.44
Number of hassles Hotelling's $T^2 = 59.15$ $F_{(2,138)} = 29.36^{***}$						
Time 1	--			140	25.82	14.13
Time 2	7.30**	--		140	20.99	14.25
Time 3	6.07**	.47	--	140	21.30	14.09
Coping strategies:						
Engagement Hotelling's $T^2 = .26$ $F_{(2,138)} = .13$						
Time 1	--			140	44.16	24.34
Time 2	-.49	--		140	45.13	25.76
Time 3	-.11	.35	--	140	44.39	26.42
Disengagement Hotelling's $T^2 = 12.11$ $F_{(2,138)} = 6.01^{**}$						
Time 1	--			140	31.79	22.05
Time 2	3.06**	--		140	26.97	18.55
Time 3	3.14**	.37	--	140	26.41	20.35
Symptom management Hotelling's $T^2 = 1.17$ $F_{(2,138)} = .58$						
Time 1	--			140	6.85	2.98
Time 2	-.88	--		140	7.04	3.28
Time 3	-1.00	.11	--	140	7.06	3.13
Psychological distress Hotelling's $T^2 = 10.26$ $F_{(2,138)} = 5.09^{**}$						
Time 1	--			140	56.53	7.62
Time 2	1.79	--		140	55.58	8.82
Time 3	3.15**	1.50	--	140	54.98	8.83
Social maladjustment subscales:						
Home management Hotelling's $T^2 = 35.82$ $F_{(2,138)} = 17.78^{***}$						
Time 1	--			140	2.51	1.88
Time 2	5.29**	--		140	1.70	1.89
Time 3	5.01**	-.28	--	140	1.74	1.89
Social interaction Hotelling's $T^2 = 10.35$ $F_{(2,138)} = 5.14^{**}$						
Time 1	--			140	1.83	1.90
Time 2	2.42*	--		140	1.52	1.83
Time 3	3.16**	1.41	--	140	1.34	1.88
Work Hotelling's $T^2 = 5.32$ $F_{(2,46)} = 2.60$						
Time 1	--			48	1.81	1.83
Time 2	1.78	--		48	1.38	1.66
Time 3	2.29	.56	--	48	1.27	1.57

Note. Time 1 (intake assessment); Time 2 (3-month assessment); Time 3 (6-month assessment).

^a Following Hotelling's T^2 , t-tests were conducted to determine where differences occurred.^b Two-tailed t-tests ($\alpha = .05; .01$) with Bonferroni alpha correction (comparison-wise $\alpha = .017; .003$, respectively).* $p < .05$ ** $p < .01$ *** $p < .001$

Figure 2

**Mean Personal Mastery Scores
(N = 140)**

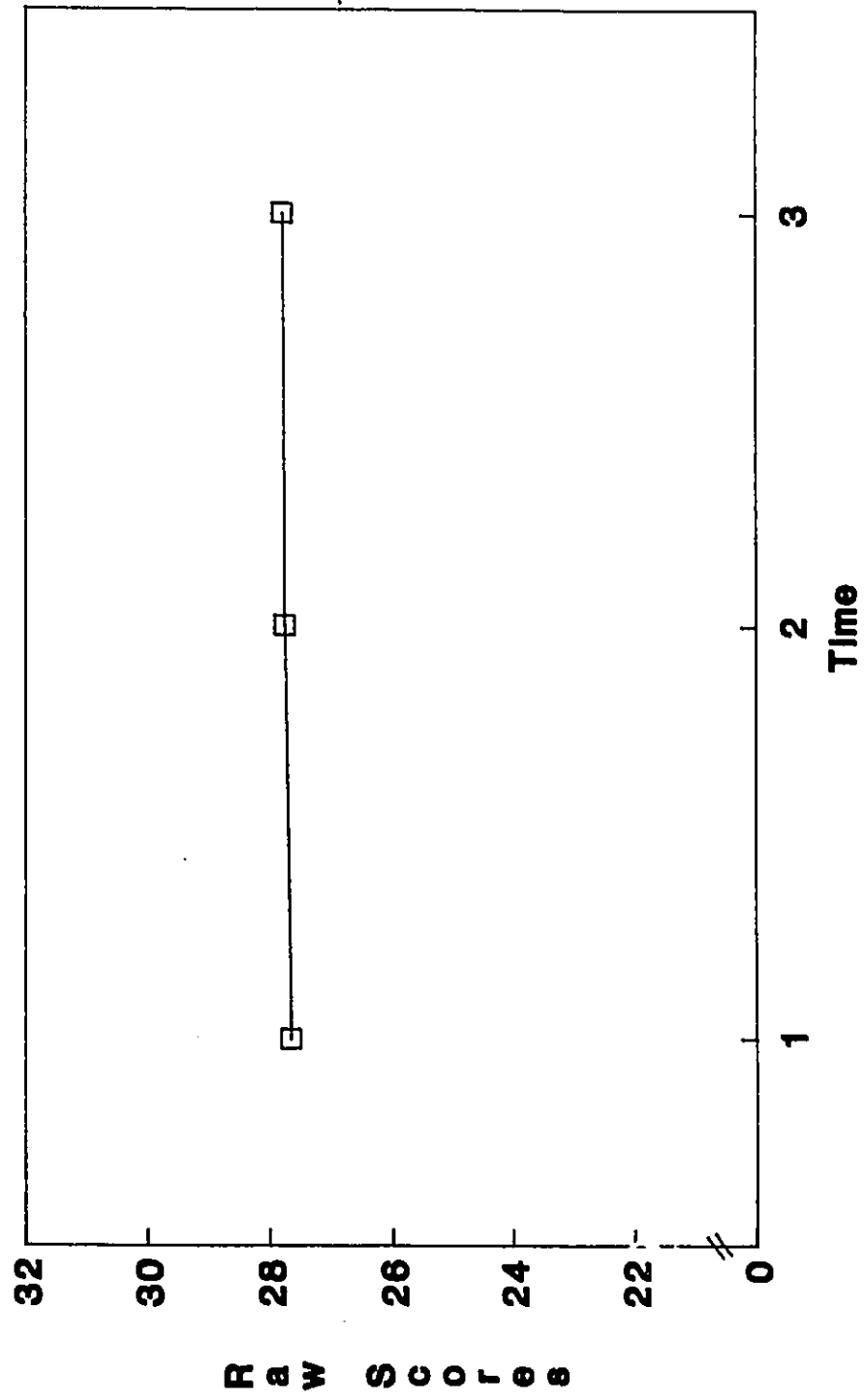


Figure 3
Mean Kilocalorie Expenditure Scores
(N = 105)

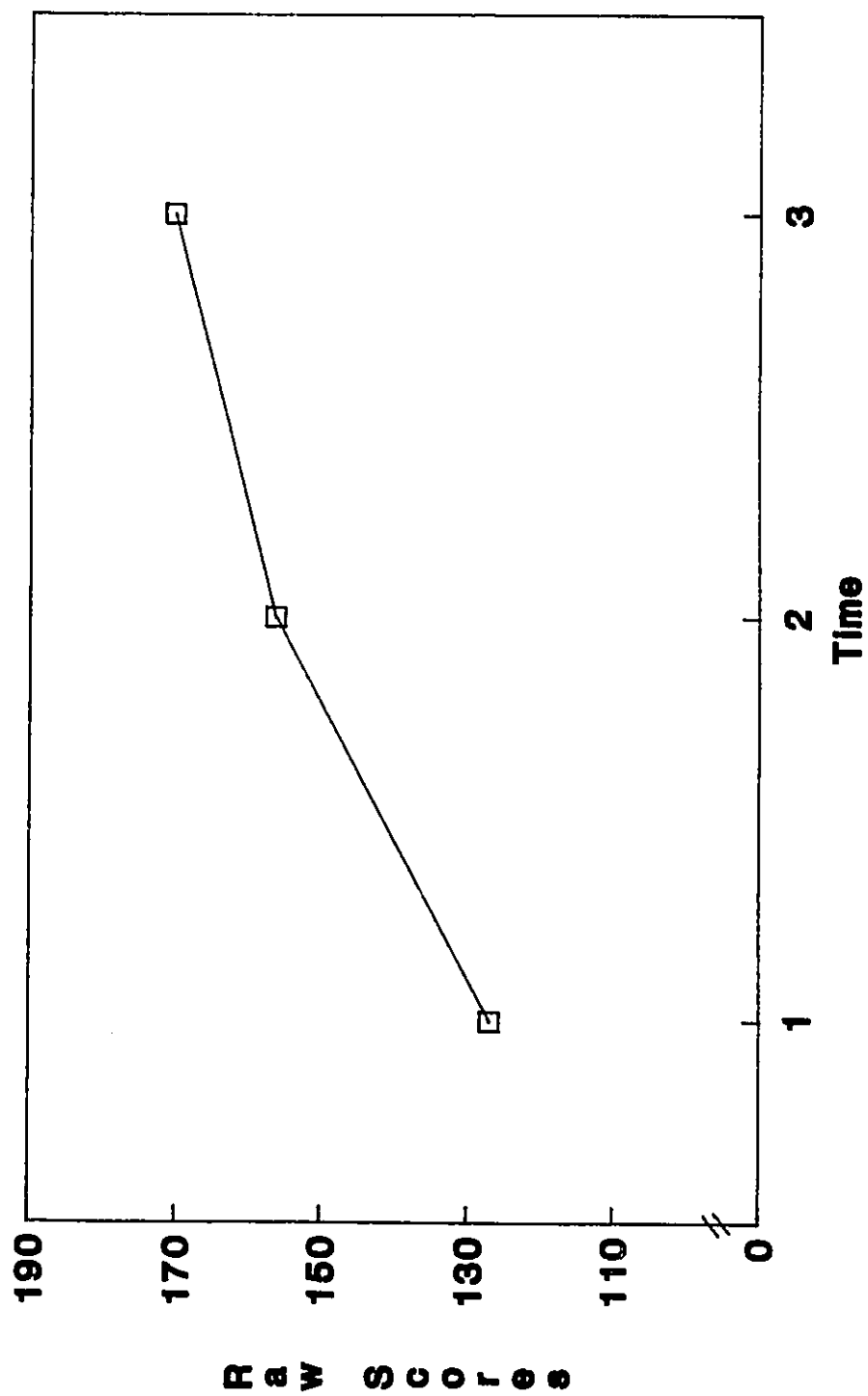


Figure 4

**Mean Number of Hassles
(N = 140)**

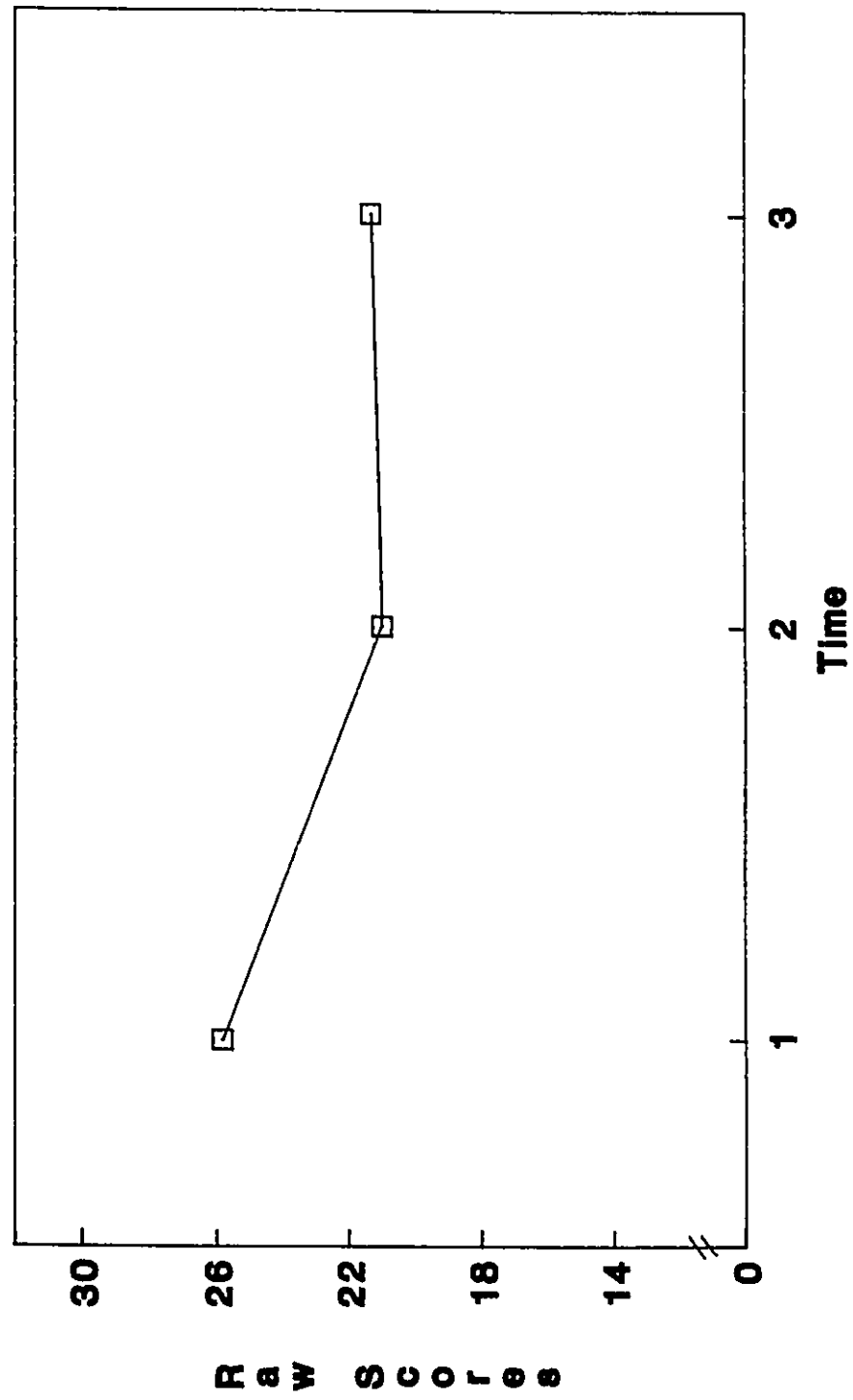
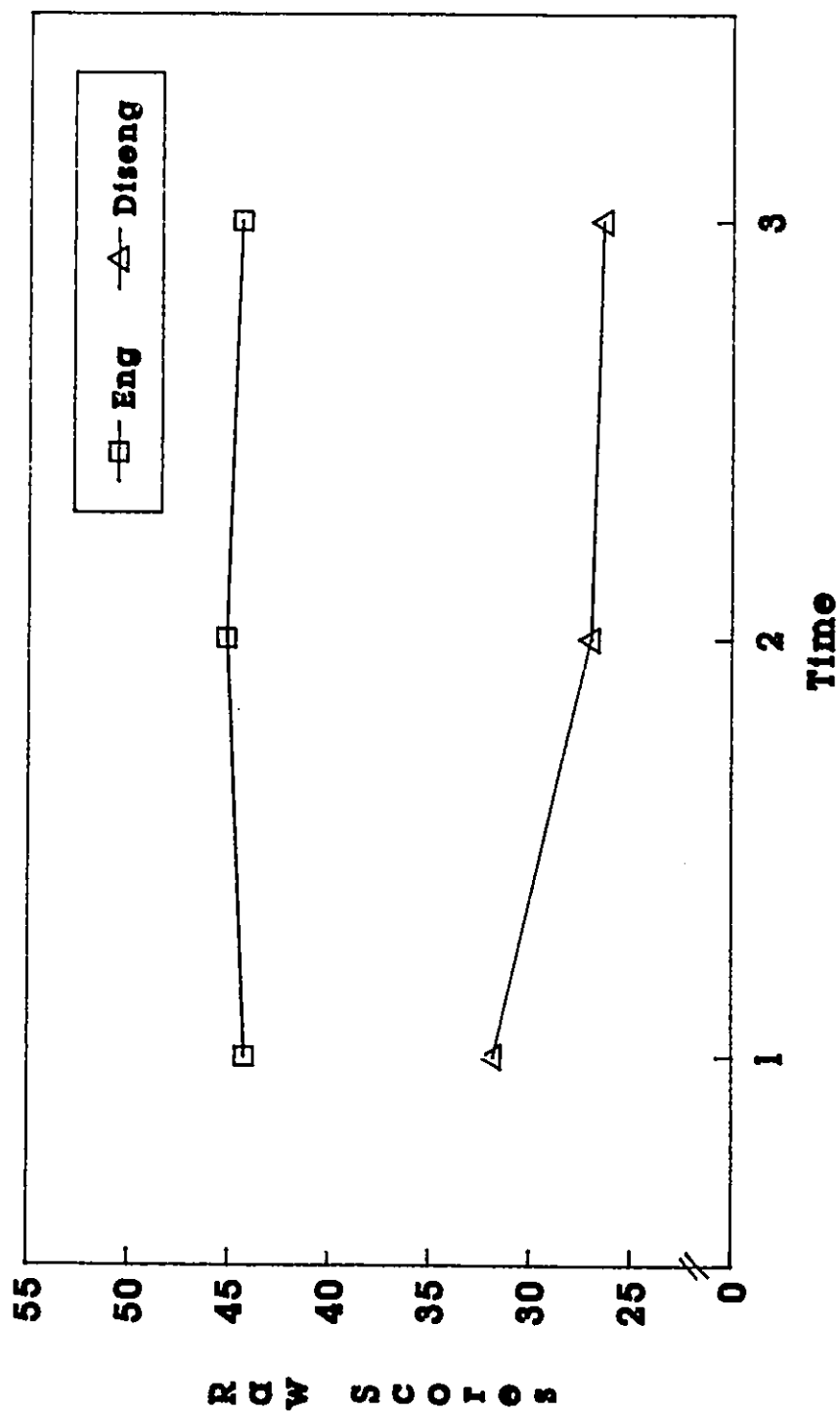


Figure 5
Mean Engagement and Disengagement Coping
Scores (N = 140)



Eng - Engagement
 Diseng - Disengagement

Figure 6
Mean Symptom Management Scores
(N = 140)

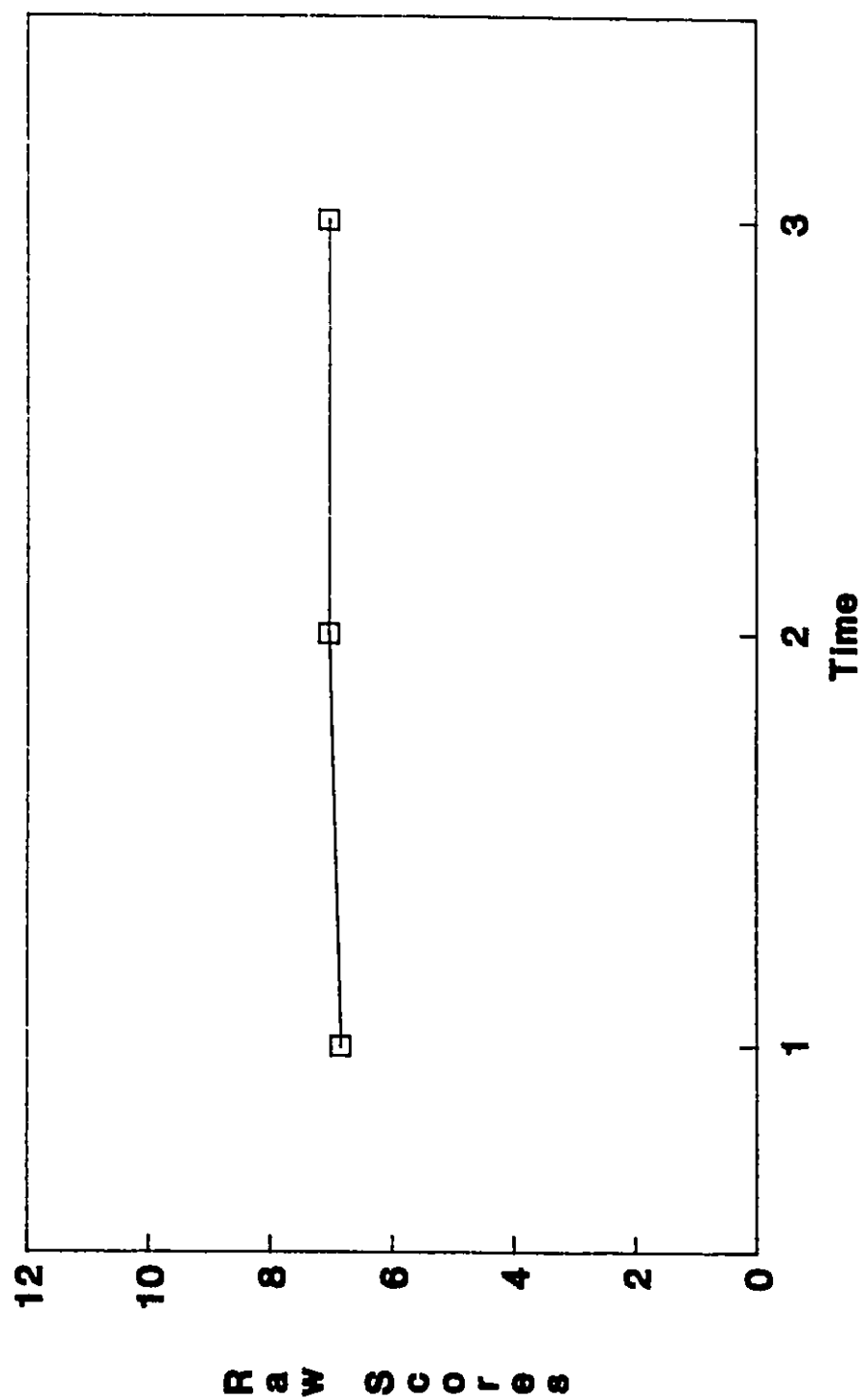


Figure 7

**Mean Psychological Distress Scores
(BSI T Scores) (N = 140)**

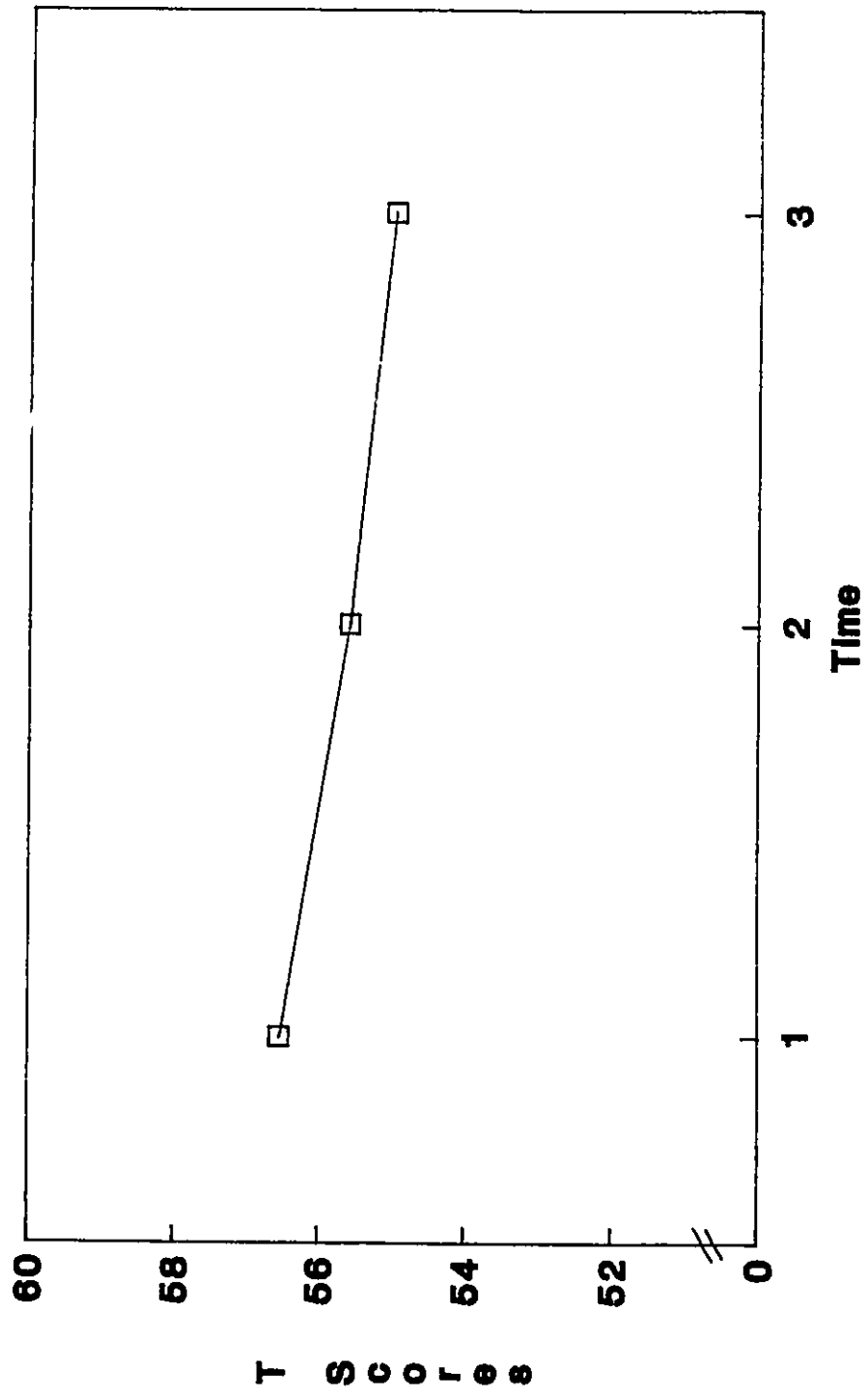
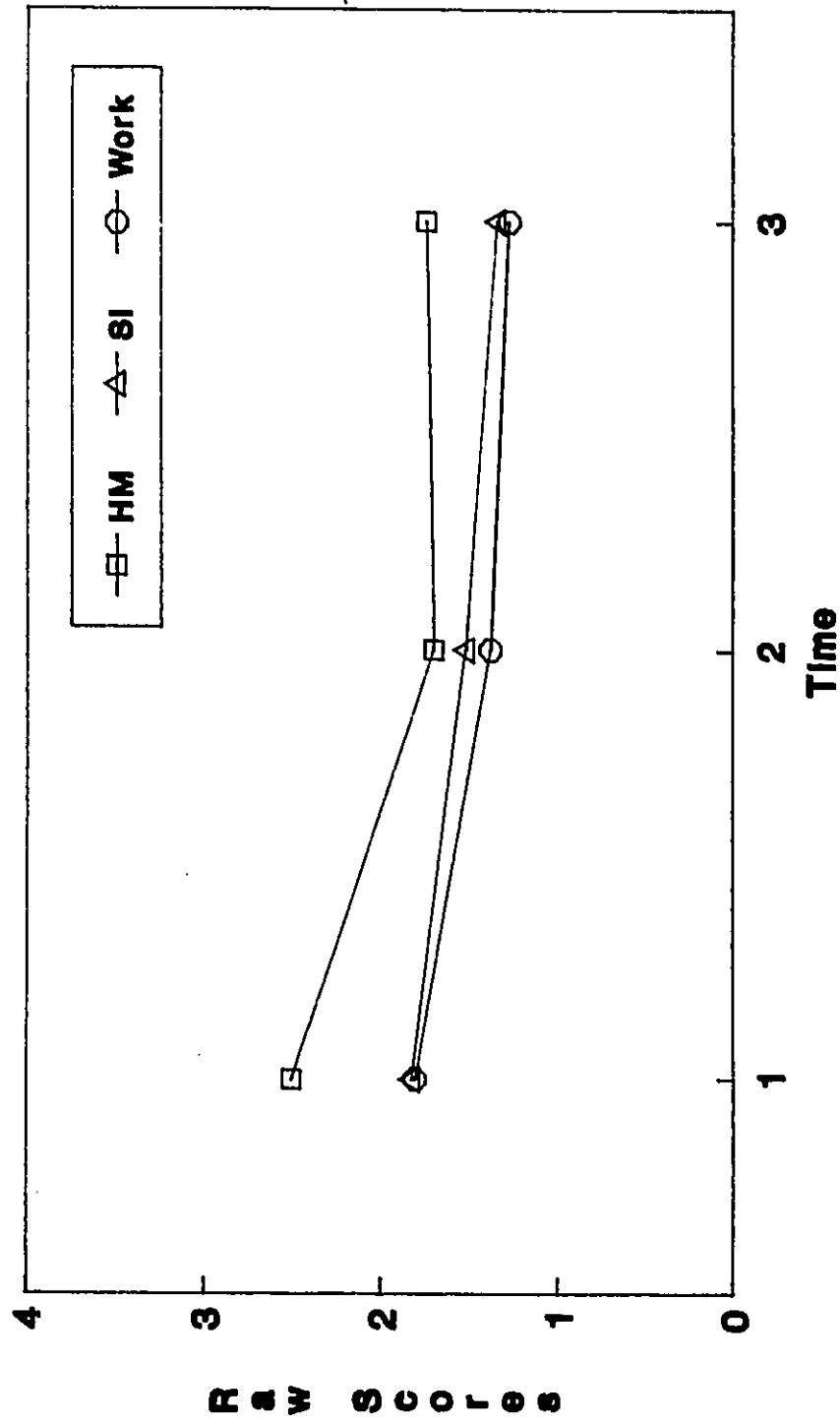


Figure 8

**Mean Sickness Impact Profile Scores
(N = 140 for HM and SI; N = 48 for Work)**



HM = Home management
SI = Social interaction

middle of the program and from the beginning to the end of the program, but work - related maladjustment remained fairly stable. Correlations between the predictor variables are shown in Table O-1 in Appendix O.

5.3 Objective 2: Prediction of Psychological Distress and Social Maladjustment Outcomes¹¹

Hierarchical multiple regression analysis (HMRA)¹² was used to provide information on the direction and strength of relationships between the predictor and outcome variables. For each outcome variable (psychological distress as measured by the BSI, and social maladjustment as measured by the three subscales of the SIP - home management, social interaction, and work), two regression models were estimated:

- 1) *Model A* estimated the effect of coping strategies entered at the time point prior to the outcome measurement (e.g., *Time 1* coping vs. *Time 2* outcome).
- 2) *Model B* estimated the effect of coping strategies entered at the same time point as the outcome measurement (e.g., *Time 2* coping vs. *Time 2* outcome).

Although these two models were not specified in the study objectives, they were both assessed in order to compare their relative strength in predicting outcomes on the basis

¹¹For the regression models, an evaluation of the assumptions of normality, linearity, homoscedasticity, multicollinearity, outliers, and influential data points can be found in Appendix I.

¹²HMRA allows assessment of significant increases in R^2 (explained variance) by the addition of each variable or block of variables to the equation. The unique contribution of that variable or block, over and above the effects of the previously entered variables, can be determined. If the increase in R^2 for any block is significant, an examination of the standardized partial regression coefficients (betas) for each predictor variable in that block can suggest which variable(s) is/are contributing to the significant increase in R^2 . Certain variables were entered as blocks in these analyses due to their being conceptually related.

of the time of coping measurement. The regressions using *Model A* will determine how well coping can predict adjustment 3 months later; whereas *Model B* will determine the strength of coping as a predictor when entered concurrently with the outcome measures. Comparison of the two models is important for two reasons: first, it will yield clinically useful information pertaining to the optimal time for coping measurement; second, it will help answer theoretical questions concerning the relationship between coping and adjustment over time.

Separate analyses, for *Model A* and *Model B*, were conducted to predict each outcome variable at each of the three time points. Specifically, *Time 1* variables were used to predict *Time 3* outcomes; *Time 1* variables were used to predict *Time 2* outcomes; and *Time 2* variables were used to predict *Time 3* outcomes (see Figure 9). In total, 24 hierarchical multiple regression equations, 6 for each outcome measure, were computed¹³. Given that a rehabilitation patient's change is clinically most important between the beginning and the end of the program, this section will focus primarily on those results occurring between *Time 1* and *Time 3*. The analyses from *Time 1* to *Time 2* and from *Time 2* to *Time 3* (i.e., from program intake to the midway point, and from the midway point to the end of the program) were conducted to determine the internal

¹³Because of the importance of identifying the pattern of results for the two models across the three time points an a priori decision was made regarding power. Given the number of analyses, an alpha correction was considered (i.e., .05/6, or .05/24), but rejected because this would have severely restricted the power of the analyses to determine significant patterns. Due to the exploratory nature of this study in examining the relative ability of the two models to predict outcomes, the risks associated with an inflated alpha had to be accepted. Furthermore, it was felt to be inadvisable to preselect those independent variables from the correlation matrices as this would have yielded equations which were sample specific (Stevens, 1986).

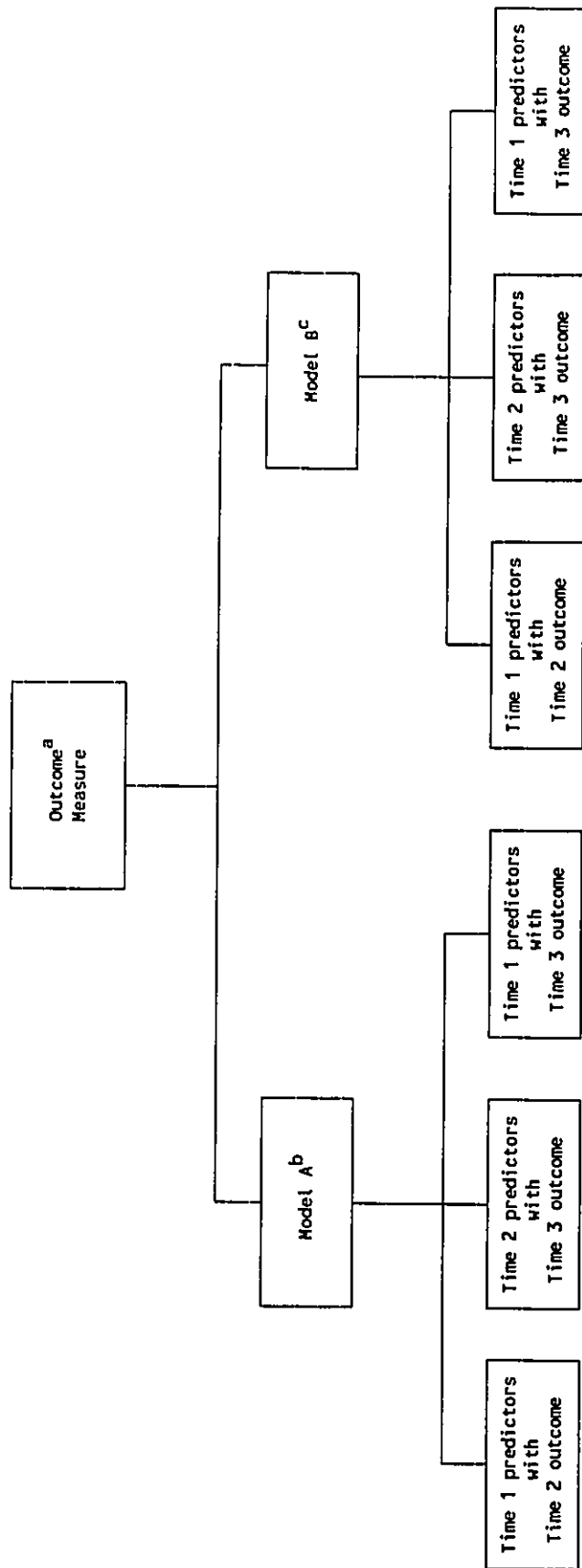


Figure 9. Hierarchical Multiple Regression Models for Analyses.

Note. Time 1 (intake assessment); Time 2 (3-month assessment, midway through cardiac rehabilitation program); Time 3 (6-month assessment, at end of program).

^a Outcome measures include Brief Symptom Inventory (BSI), Sickness Impact Profile (SIP) subscales - Home Management (HM), Social Interaction (SI), and Work (W).

^b Coping Strategies Inventory (CSI) from same time of measurement as other predictors.

^c CSI from same time of measurement as outcome.

replicability of the findings and are discussed here only briefly. The detailed results from those analyses are presented in Appendices K to N.

The ordering of the independent variables in the regression equations was theoretically derived. The following hierarchical entry of the variables was used for each equation at each time point. First, the outcome variable (either level of psychological distress or one of the social maladjustment scores) at the previous time point was entered as Block 1 in the regression equation, to control for initial level of adjustment. This procedure generates a residualized change score, because the initial adjustment score is partialled out during the first step of the equation (Cronbach & Furby, 1970). Second, four demographic variables (age, education, marital status, employment status) were entered as a block. Education, marital status and employment status were entered as dummy variables. Subjects were divided into primary and secondary education (= 0) versus post-secondary education (= 1), presently married (= 1) or not married (= 0), and presently employed (= 1) or not employed (= 0). Personal mastery was entered third, as personality variables are entered prior to coping processes in Lazarus et al.'s theoretical framework (Lazarus & Folkman, 1984; Folkman et al., 1986). Cardiac functional capacity as measured by kilocalorie expenditure was entered fourth, followed by the number of stressors (frequency) as measured by the Hassles and Concerns Scale. The frequency score was used because it was strongly correlated with the outcome measures (i.e., psychological distress and SIP subscales) and it was a more sensitive measure of change compared to the severity and intensity scores (see Section 5.2.1). The

physical status of the patient was entered prior to their chronic stress level, given that their cardiac status precedes their stress level in time. In addition, the level of stress may be influenced by the patients' cardiac functional capacity (i.e., patients may report increased concern regarding experiencing chest pain). With this ordering the potential effects would be partialled out. Finally, the three coping strategies (engagement, disengagement, and symptom management) were entered as a block. In *Model A*, the coping strategies from the assessment time prior to that at which the outcome variable was measured were entered as a block. In *Model B*, on the other hand, the coping strategies from the same time point at which the outcome variable was measured, were entered as a block. The three coping strategies were entered in the same block because there were no *a priori* grounds for their order. The only exception to the variable entry procedure just described occurred in the equation in which work functioning (on the SIP), was the dependent variable. Employment status was not entered in this case because only patients who were working completed the SIP work subscale.

The order of entry of the first 4 variables was based upon their being conceptualized as potential antecedents of stress, coping, and outcomes. Thus, their effects would be controlled statistically and their effects on the other predictors would be partialled out.

Patients who had returned the questionnaire packages at the two time points being compared and who had also completed the coping questionnaire at the relevant time point (for *Model A* and *Model B*) comprised the sample for the hierarchical

regression analyses. Due to missing data, the various analyses were based on different sample sizes (see Table J-1 in Appendix J).

5.3.1 Correlations Among Outcome Variables

The correlations among the outcome variables at the three time points are shown in Table 6. The BSI was not highly correlated with the SIP subscales of home management and work (r 's ranged from .17 to .35 across time points), but was modestly to moderately correlated with social interaction (r 's ranged from .38 to .56 across time points). The SIP subscales were moderately intercorrelated: home management with social interaction (r ranged from .25 to .53 across time points) and with work (r ranged from .26 to .47 across time points), and social interaction with work (r 's ranged from .34 to .43 across time points). The BSI scores were more highly intercorrelated across the three time points than were the SIP scores.

Correlations between the predictor variables and the two outcome measures are shown in Table 7. There were 33 significant correlations out of 54 between the predictors and psychological distress; 13 exceeded .50. The SIP subscales were not as highly correlated with the predictor variables. There were 76 significant correlations out of 159 between the predictors and the 3 subscales of the SIP however, none of the correlations being above .50.

Zero-order Correlations^a Between Outcome Variables at the Three Time Points (*n* ranges from 89 to 220).

Note. Time 1 (intake assessment); **Time 2** (3 month assessment); **Time 3** (6 month assessment).

^c A higher score represents greater social maladjustment.

Table 7
Zero-order Correlations^a Between Predictor Variables and Outcome Measures at the Three Time Points (*N* ranges from 89^b to 223).

Psychological distress (BSI)				Social maladjustment (SIP)											
	Home management			Social interaction			Work			M/%	SD	n			
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3						
Demographics:															
Age (years)															
Time 1	-.16*	-.16*	-.10	.05	.15*	.17*	-.04	-.07	-.03	.22*	.13	.21*	53.61	8.64	223
Education															
(1-post-secondary; 0-primary/secondary)															
Time 1	-.11	-.01	-.15*	-.07	-.01	-.04	-.05	-.08	-.03	-.02	-.17	-.06	44%	.48	212
Marital status															
(1-married; 0-not married)															
Time 1	-.04	-.06	-.06	.00	.01	.03	.09	-.04	.01	-.04	-.07	.13	89%	.32	213
Time 2		.01	-.01	-.02	-.02	-.01	-.06	-.06	.00	-.08	-.08	.08	90%	.29	199
Time 3		-.02	-.02	-.01	-.01	-.01	-.06	-.06	-.01	-.09	-.09	.09	92%	.28	190
Employment															
(1-employed; 0-not employed ^c)															
Time 1	.05	.02	.01	-.16*	-.06	.05	-.03	.01	.03	--	.11	-.03	42%	.49	213
Time 2		.04	.02	-.14	-.04	-.04	-.03	-.03	-.01	--	--	-.18	56%	.50	199
Time 3		-.05	-.05	-.12	-.12	-.12	-.03	-.03	-.03	--	--	--	56%	.50	190
Personal mastery															
Time 1	-.45***	-.47***	-.46***	-.29***	-.22**	-.20**	-.34***	-.28***	-.30***	-.21	-.16	-.12	27.86	5.41	213
Time 2		-.58***	-.59***	-.30***	-.19*	-.19*	-.40***	-.40***	-.32***	-.36***	-.36***	-.33***	28.16	5.36	199
Time 3		-.61***	-.61***	-.31***	-.36***	-.36***	-.43***	-.43***	-.43***	-.26**	-.26**	-.26**	27.78	5.58	190
Kilocalorie expenditure															
Time 1	-.04	-.06	-.06	-.19**	-.28***	-.22**	-.20**	-.16*	.13	-.15	-.22*	-.07	125.45	34.77	197
Time 2		-.10	-.14	-.32***	-.19*	-.19*	-.17*	-.17*	.13	-.05	-.19	-.05	154.88	46.32	174
Time 3		-.26**	-.26**	-.36***	-.36***	-.36***	-.18*	-.18*	.18*	-.18	-.18	-.18	173.70	59.99	154
Number of hassles															
Time 1	.62***	.65***	.68***	.31***	.18**	.24***	.47***	.39***	.37***	.28**	.35***	.28**	23.47	13.75	213
Time 2		.70***	.74***	.22**	.23***	.23***	.44***	.44***	.38***	.32***	.32***	.31***	19.31	13.60	198
Time 3		.76***	.76***	.34***	.34***	.34***	.42***	.42***	.42***	.32***	.32***	.32***	19.24	13.28	189
Coping variables:															
Engagement															
Time 1	.11	.17*	.21**	.11	.04	.06	.09	.10	.08	.20	.12	.28**	44.12	24.59	195
Time 2		.21**	.17*	.07	.23**	.23**	.11	.11	.07	.13	.13	.28**	43.68	25.63	179
Time 3		.29***	.29***	.17*	.17*	.17*	.05	.05	.05	.19	.19	.19	43.84	26.41	161
Disengagement															
Time 1	.33***	.49***	.46***	.28***	.19*	.20**	.37***	.32***	.30***	.15	.20*	.13	31.01	22.46	195
Time 2		.58***	.53***	.15*	.21**	.21**	.37***	.37***	.31***	.21*	.21*	.08	25.69	18.41	179
Time 3		.55***	.55***	.21**	.21**	.21**	.35***	.35***	.35***	.23*	.23*	.23*	27.53	21.32	161
Symptom management															
Time 1	.34***	.44***	.40***	.06	.00	-.02	.12	.17*	.08	.12	.18	.20*	6.36	2.95	213
Time 2		.53***	.47***	.08	.05	.05	.30***	.30***	.22**	.21*	.21*	.23*	6.48	3.31	199
Time 3		.48***	.48***	.06	.06	.06	.23**	.23**	.23**	.27**	.27**	.27**	6.65	3.19	188
N	55.94	54.28	53.76	2.36	1.70	1.57	1.71	1.41	1.18	2.22	1.56	1.42			
SD	7.89	8.53	8.75	1.86	1.92	1.86	1.93	1.78	1.74	1.98	1.81	1.83			
n	220	199	188	213	199	190	213	199	190	89	112	107			

Note. Time 1 (intake assessment); Time 2 (3 month assessment); Time 3 (6 month assessment).

* Pairwise comparisons with two-tailed significance.

^b Only patients who were working completed the work subscale of the SIP.

^c Only 4% of patients were unemployed, 31% were on disability or sick leave, and 23% were retired.

* $p < .05$ ** $p < .01$ *** $p < .001$

5.3.2 Hypothesis 1: Prediction of psychological distress¹⁴

In predicting changes in patients' psychological distress from the beginning of the program (i.e., at *Time 1*) to the end (i.e., at *Time 3*), statistically significant increments in R^2 were added by the following variables in both *Model A* and *Model B*¹⁵ (see Table 8): initial psychological distress, personal mastery, number of hassles, and the block of coping strategies composed of engagement, disengagement and symptom management coping. Together, the variables in *Model A* explained an additional 13% of the variance in psychological outcome at *Time 3* beyond that accounted for by *Time 1* distress. In *Model B*, these variables accounted for an additional 18% of the variance. In *Model A*, the coping variables accounted for 3% of the variance, whereas in *Model B*, they accounted for 8% of the variance. The total variance accounted for by the regression equations for *Model A* was 66% and for *Model B* was 75.%. The beta coefficients¹⁶ for these significant variables indicate the following pattern of relative relationships to psychological distress (see Table 8). In both *Model A* and *Model B*, patients with higher initial psychological distress at intake, low personal mastery, a greater number of hassles, and higher scores on disengagement coping experienced more psychological distress at

¹⁴For purposes of readability, the R^2 , ΔR^2 and β are not presented in this text, but are provided in the tables following the discussion of each regression.

¹⁵*Model A* utilized coping strategies entered at the time point prior to the outcome measurement, and *Model B* utilized coping strategies entered at the same time point as the outcome measurement.

¹⁶The beta coefficient for each significant variable in the equations provides information on their relative relationship to the outcome variable.

Table 8

Hierarchical Multiple Regression of Psychological Distress (BSI score; Time 3) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 179)					Model B (n = 160)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 psychological distress	.73***	.73***	.53	.53***	201.56***	.75***	.75***	.56	.56***	202.21***
2 <u>Demographic variables</u>										
Age	.07					.11				
Education ^b	-.03					-.05				
Marital status ^b	-.03					-.07				
Employment status ^b	-.02	.73***	.54	.01	.67	.04	.76***	.58	.02	1.41
3 Personal mastery	-.16**	.75***	.56	.02**	8.16**	-.17**	.77***	.60	.02**	8.91**
4 Kilocalorie expenditure	-.04	.75***	.56	.00	.42	-.06	.78***	.60	.00	1.30
5 Number of hassles	.35***	.80***	.63	.07***	33.46***	.34***	.82***	.67	.06***	28.64***
6 <u>Coping variables</u>										
Engagement	.04					.11*				
Disengagement	.14**					.24***				
Symptom management	.08	.81***	.66	.03**	4.16**	.08	.87***	.75	.08***	16.75***
Total equation			<u>Model A</u> R ² = .66 F _(11,167) = 29.36					<u>Model B</u> R ² = .75 F _(11,148) = 40.53		
			Mean of DV = 54.18 SD = 8.75					Mean of DV = 54.86 SD = 8.81		

* β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

the end of the program. In *Model B*, greater reliance on engagement (and not simply disengagement) coping strategies also contributed to more distress at *Time 3*.

In predicting psychological distress during the first half (*Time 1* to *Time 2*) and last half (*Time 2* to *Time 3*) of the rehabilitation program, with both *Model A* and *Model B*, some of these findings were replicated. The beta coefficients for the significant variables illustrate that patients with higher initial psychological distress, lower personal mastery, and a greater number of hassles experienced more distress at *Time 2* and *Time 3* respectively (see Tables K-1, K-2 in Appendix K). In *Model B* the block of coping strategies was significant for both halves of the program, whereas in *Model A*, coping was significant only in the first half. Between *Time 1* and *Time 2*, i.e., during the first half of the program, for both models the beta coefficients indicated that patients with higher scores on disengagement coping and on symptom management coping experienced more psychological distress at *Time 2*. From *Time 2* to *Time 3*, in *Model B*, only disengagement coping was significant in predicting greater psychological distress. During the last half of the program, for both *Model A* and *Model B*, the demographic block was significant, with the betas indicating that patients with less education experienced more psychological distress at *Time 3*. Table 9, summarizes the variables or blocks of variables which contributes significant increments in R^2 across the three time points and for both models. Across the three time points for both *Model A* and *Model B*, the most consistent predictors of psychological distress are personal mastery, number of hassles, and the coping variables. On the other hand, the demographic variables and kilocalorie

Table 9

Summary Table of Hierarchical Multiple Regression of Psychological Distress (BSI Score) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points.

Block Variables	Time 1 predictors with Time 2 BSI			Time 2 predictors with Time 3 BSI			Time 3 predictors with Time 3 BSI		
	Model A n = 185	Model B n = 177	ΔR^2	Model A n = 171	Model B n = 158	ΔR^2	Model A n = 179	Model B n = 160	ΔR^2
1 Psychological distress at previous time point	.49***	.49***		.65***	.69***		.53***	.56***	
2 <u>Demographic variables</u>									
Age									
Education ^a									
Marital status ^a	.00	.01		.02*	.02		.01	.02	
Employment status ^a	.03***	.03***		.02**	.02**		.02**	.02**	
3 Personal mastery	.00	.00		.00	.00		.00	.00	
4 Kilocalorie expenditure	.06***	.05***		.05***	.03***		.07***	.06***	
5 Number of hassles									
6 <u>Coping variables</u>									
Engagement	.05***	.09***		.00	.04***		.03**	.08***	
Disengagement									
Symptom management									
<u>Total equation</u>	$R^2 = .64$ $F_{(11,173)} = 27.48***$	$R^2 = .66$ $F_{(11,165)} = 29.36***$	$R^2 = .74$ $F_{(11,159)} = 41.75***$	$R^2 = .80$ $F_{(11,146)} = 54.68***$	$R^2 = .86$ $F_{(11,167)} = 29.36$	$R^2 = .75$ $F_{(11,148)} = 40.53$			
Mean of DV	54.61	54.78	53.92	54.67	54.18	54.86			
SD	8.58	8.53	8.76	8.79	8.75	8.81			

^a Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

expenditure (i.e., cardiac functional capacity) virtually never predict psychological distress.

5.3.3 Hypothesis 2: Prediction of Social Maladjustment

Home management subscale. In predicting deleterious changes in home management activity at *Time 3* from *Time 1* variables with both *Model A* and *Model B*, the following variables or block of variables contributed significant increments in R^2 (see Table 10): initial home management functioning, and the block of demographic variables. In *Model B*, the number of hassles was also significant. In *Model A*, demographic variables added 5% to the explained variance in home management outcome at *Time 3* beyond that accounted for by *Time 1* functioning. In *Model B*, the significant variables accounted for an additional 7% of the variance. The total variance accounted for by the regression equation for *Model A* was 35% and for *Model B* was 40%. The beta coefficients for these significant variables suggest that patients who had higher scores on home management, were older, or employed experienced more negative changes in the domain of home management at the end of the program (i.e., higher scores signify deterioration in functioning). In *Model B*, in addition to the variables above, a higher number of hassles predicted more negative change in functioning (see Table 10).

Table 10

Hierarchical Multiple Regression of Home Management Activity (SIP-HM score; Time 3) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 179)					Model B (n = 160)				
	β^a	Δ	R^2	ΔR^2	ΔF	β^a	R	R^2	ΔR^2	ΔF
1 Time 1 home management	.53***	.53***	.28	.28***	67.60***	.54***	.54***	.29	.29***	65.29***
2 <u>Demographic variables</u>										
Age	.19*									
Education ^b	-.02					.21**				
Marital status ^b	.01					-.01				
Employment status ^b	.17*	.57***	.32	.05*	3.10*	-.00	.58***	.34	.05*	2.77*
3 Personal mastery	-.05	.57***	.33	.00	.53	-.06	.59***	.34	.00	.75
4 Kilocalorie expenditure	-.09	.58***	.33	.01	1.78	-.11	.59***	.35	.01	2.47
5 Number of hassles	.11	.59***	.34	.01	2.39	.17*	.61***	.37	.02*	4.67*
6 <u>Coping variables</u>										
Engagement	-.01					.12				
Disengagement	.03					.09				
Symptom management	-.09	.59***	.35	.01	.64	-.12	.63***	.40	.02	1.95
Total equation			<u>Model A</u> $R^2 = .35$ $F_{(11,167)} = 8.19***$					<u>Model B</u> $R^2 = .40$ $F_{(11,148)} = 8.86***$		
			Mean of DV = 1.64 SD = 1.89					Mean of DV = 1.66 SD = 1.85		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

In predicting change in home management during the first half (*Time 1* to *Time 2*) and second half (*Time 2* to *Time 3*) of the rehabilitation program, different results were obtained depending on the time point at which the outcome was measured (see Tables L-1, L-2 in Appendix L). During the first half of the program, with both *Model A* and *Model B*, patients with higher scores on home management, who were older, or who had lower kilocalorie expenditure, experienced more negative changes in the domain of home management. However, from the middle to the end of the program, in *Model A*, patients with a higher number of hassles or who more often employed engagement coping strategies experienced more negative change at the end of the program. In *Model B*, only the number of hassles contributed to greater change in home management. Table 11, summarizes the variables or blocks of variables which contributes significant increments in R^2 across the three time points and for both models. None of the variables predicted deterioration in home management functioning consistently across the 3 time points, or between models. The demographic variables, kilocalorie expenditure, and number of hassles were found to be significant in some equations, while personal mastery and the coping variables were virtually never significant.

Social interaction subscale. When predicting health-related negative changes in social interaction at *Time 3* from *Time 1* variables (see Table 12) in both *Model A* and *Model B*, statistically significant increments in R^2 were added by initial social interaction functioning and personal mastery. In *Model B*, in addition to these variables, the block of coping strategies was also significant. In *Model A*, personal mastery added 2% to the

Table 11

Summary Table of Hierarchical Multiple Regression of Home Management Activity (SIP-HM Score) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points.

Block Variables	Time 1 predictors with Time 2 HM		Time 2 predictors with Time 3 HM		Time 3 predictors with Time 3 HM	
	Model A n = 185	Model B n = 177	Model A n = 171	Model B n = 158	Model A n = 179	Model B n = 160
	ΔR^2	ΔR^2	ΔR^2	ΔR^2	ΔR^2	ΔR^2
1 Home management at previous time point	.29***	.27***	.28***	.28***	.28***	.29***
2 <u>Demographic variables</u>						
Age						
Education ^a						
Marital status ^a	.02	.02	.02	.02	.05*	.05*
Employment status ^a	.00	.00	.01	.01	.00	.00
3 Personal mastery	.02*	.03*	.00	.00	.01	.01
4 Kilocalorie expenditure	.00	.00	.03*	.02*	.01	.02*
5 Number of hassles						
6 <u>Coping variables</u>						
Engagement						
Disengagement						
Symptom management	.00	.01	.04*	.02	.01	.02
Total equation	$R^2 = .33$ $F_{(11,173)} = 7.88***$	$R^2 = .33$ $F_{(11,165)} = 7.34***$	$R^2 = .36$ $F_{(11,159)} = 8.26***$	$R^2 = .35$ $F_{(11,146)} = 7.02***$	$R^2 = .35$ $F_{(11,167)} = 8.19***$	$R^2 = .40$ $F_{(11,140)} = 8.86***$
Mean of DV	1.71	1.66	1.56	1.65	1.64	1.66
SD	1.93	1.88	1.81	1.85	1.89	1.85

^a Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 12

Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 3) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 179)					Model B (n = 160)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 social interaction	.51***	.51***	.26	.26***	63.03***	.56***	.56***	.31	.31***	71.91***
2 <u>Demographic variables</u>										
Age	.00									
Education ^b	.02					.04				
Marital status ^b	-.01					.02				
Employment status ^b	.03	.51***	.26	.00	.11	-.02				
						.07	.56***	.32	.01	.33
3 Personal mastery	-.14*	.53***	.28	.02*	4.35*	-.15*	.58***	.34	.02*	4.50*
4 Kilocalorie expenditure	-.02	.53***	.28	.00	.12	-.05	.58***	.34	.00	.44
5 Number of hassles	.15	.55***	.30	.01	3.62	.15	.60***	.35	.01	3.36
6 <u>Coping variables</u>										
Engagement	.03					-.06				
Disengagement	.08					.24***				
Symptom management	-.10	.56***	.31	.01	1.09	-.04	.64***	.40	.05**	4.17
Total equation										
		R ² = .31						Model A		
		F _(11,167) = 6.87***						R ² = .40		
								F _(11,148) = 9.15***		
		Mean of DV = 1.24						Mean of DV = 1.31		
		SD = 1.78						SD = 1.84		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

explained variance in outcome at *Time 3* beyond that accounted for by changes in social interaction at *Time 1*, whereas in *Model B*, the significant variables explained an additional 7% of the variance. The total variance accounted for by the regression equation for *Model A* was 31% and for *Model B* was 40%. The beta coefficients for these significant variables suggest that in *Model A*, lower personal mastery was related to negative changes in social interaction. In *Model B*, lower personal mastery and higher scores on disengagement coping were related to a greater number of negative changes in social interaction (see Table 12).

In predicting social interaction functioning during the first half and last half of the program with *Model A*, only initial social interaction was statistically significant. In *Model B*, in addition to initial social interaction functioning, the block of coping strategies was also significant. Greater reliance on disengagement coping predicted more negative changes in social interactions (see Tables M-1, M-2 in Appendix M). Table 13, summarizes the variables or blocks of variables which contributes significant increments in R^2 across the three time points and for both models. None of the variables consistently predicted deterioration in social interaction across the 3 time points, or between models. Personal mastery and the coping variables were found to be significant in some equations, whereas the demographic variables, kilocalorie expenditure, and number of hassles never reached significance.

Work functioning subscale. In predicting changes in work functioning from the beginning to the end of the program (see Table 14), only initial work functioning was

Table 13

Summary Table of Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI Score) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points.

Block Variables	Time 1 predictors with Time 2 SI			Time 2 predictors with Time 3 SI			Time 3 predictors with Time 3 SI		
	Model A n = 185	Model B n = 177	ΔR^2	Model A n = 171	Model B n = 158	ΔR^2	Model A n = 179	Model B n = 160	ΔR^2
1 Social interaction at previous time point	.47***	.47***		.42***	.45***		.26***	.31***	
2 <u>Demographic variables</u>									
Age									
Education ^a									
Marital status ^a									
Employment status ^a	.01	.01		.00	.01		.00	.01	
3 Personal mastery	.00	.01		.00	.00		.02*	.02*	
4 Kilocalorie expenditure	.00	.00		.00	.00		.00	.00	
5 Number of hassles	.00	.00		.01	.01		.01	.01	
6 <u>Coping variables</u>									
Engagement									
Disengagement									
Symptom management	.01	.05***		.00	.03*		.01	.05**	
Total equation	$R^2 = .49$ $F_{(11,173)} = 15.21***$	$R^2 = .54$ $F_{(11,165)} = 17.72***$		$R^2 = .44$ $F_{(11,159)} = 11.51***$	$R^2 = .44$ $F_{(11,146)} = 13.34***$		$R^2 = .31$ $F_{(11,167)} = 6.87***$	$R^2 = .40$ $F_{(11,143)} = 9.15***$	
Mean of DV	1.43	1.42		1.19	1.28		1.24	1.31	
SD	1.78	1.78		1.78	1.84		1.78	1.84	

^a Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 14

Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 3) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 65)					Model B (n = 56)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 work functioning	.55***	.55***	.30	.30***	26.80***	.55***	.55***	.30	.30***	23.61***
2 <u>Demographic variables</u>										
Age	.02					.09				
Education ^b	.04					.03				
Marital status ^b	.20	.59***	.34	.04	1.35	.19	.60***	.36	.05	1.43
3 Personal mastery	.05	.59***	.34	.00	.16	-.06	.60***	.36	.00	.24
4 Kilocalorie expenditure	-.11	.60***	.35	.01	.84	-.20	.63***	.39	.03	2.72
5 Number of hassles	.19	.61***	.38	.02	2.08	.13	.64***	.41	.01	.81
6 <u>Coping variables</u>										
Engagement	.08					-.13				
Disengagement	.14					.23				
Symptom management	.10	.64***	.41	.03	.97	.20	.69***	.47	.07	1.93
<u>Total equation</u>										
			<u>Model A</u>					<u>Model B</u>		
			R ² = .41					R ² = .47		
			F _(10,54) = 3.73***					F _(10,45) = 4.04***		
			Mean of DV = 1.46					Mean of DV = 1.41		
			SD = 1.91					SD = 1.80		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married).

* $p < .05$ ** $p < .01$ *** $p < .001$

statistically significant in both *Model A* and *Model B*. The total variance accounted for by the regression equation for *Model A* was 41% and for *Model B* was 47%.

Other variables were significant when predicting changes in work functioning during the first half and last half of the program. Patients with lower kilocalorie made more changes in their work environments from *Time 1* to *Time 2* with both *Model A* and *Model B*, while from *Time 2* to *Time 3*, patients with lower personal mastery made more changes (see Tables N-1, N-2 in Appendix N). Table 15, summarizes the variables or blocks of variables which contributes significant increments in R^2 across the three time points and for both models. None of the variables consistently predicted deterioration in work functioning across the 3 time points, or between models. Personal mastery and kilocalorie expenditure were found to be significant in some equations, whereas the demographic variables, number of hassles, and the coping variables were never found to be significant.

Table 15

Summary Table of Hierarchical Multiple Regression of Work Functioning (SIP-Work Score) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Hassles, Coping from the Previous Time Point of Measurement (Model A), and Coping at the Time of Measurement (Model B) Between the Three Time Points.

Block Variables	Time 1 predictors with Time 2 Work			Time 2 predictors with Time 3 Work			Time 3 predictors with Time 3 Work		
	Model A n = 73	Model B n = 69	ΔR^2	Model A n = 87	Model B n = 82	ΔR^2	Model A n = 65	Model B n = 56	ΔR^2
1 Work at previous time point	.44***	.44***		.52***	.52***		.30***	.30***	
2 <u>Demographic variables</u>									
Age									
Education ^a	.02	.03		.01	.02		.04	.05	
Marital status ^a	.00	.00		.03*	.03*		.00	.00	
3 Personal mastery	.04*	.05*		.01	.01		.01	.03	
4 Kilocalorie expenditure	.03	.02		.01	.00		.02	.01	
5 Number of hassles									
6 <u>Coping variables</u>									
Engagement	.01	.02		.03	.01		.03	.07	
Disengagement									
Symptom management									
Total equation	$R^2 = .54$ $F_{(10,62)} = 7.22***$	$R^2 = .56$ $F_{(10,58)} = 7.46***$		$R^2 = .61$ $F_{(10,76)} = 12.05***$	$R^2 = .60$ $F_{(10,71)} = 10.67***$		$R^2 = .41$ $F_{(10,34)} = 3.73***$	$R^2 = .47$ $F_{(10,45)} = 4.04***$	
Mean of DV	1.67	1.64		1.32	1.33		1.46	1.41	
SD	1.91	1.89		1.61	1.59		1.91	1.80	

^a Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married).

* $p < .05$ ** $p < .01$ *** $p < .001$

5.4 Objective 3: Relationship Between Coping Strategies and Outcome Variables

5.4.1 Research Question 2: Correlations between Coping Strategies Inventory, Symptom Management Scale, psychological distress, and social maladjustment at the 3 time points

As a more disaggregated complement to the regression analyses, correlations¹⁷ between coping strategies (primary, secondary, and tertiary levels of CSI, and the SMS) and the psychological distress and social maladjustment outcomes, at the three time points were examined cross-sectionally and longitudinally. Given the vast number of correlations, only a summary of the most salient findings will be presented here. For more details refer to Tables 16, 17, 18.

The four primary-level and two secondary-level CSI coping strategies making up the tertiary-level (global) disengagement factor had stronger, statistically significant, positive correlations with psychological distress (primary level $z = 2.28$, $p < .05$; secondary level $z = 2.90$, $p < .01$) and the social interaction subscale of the SIP (primary level $z = 1.87$, $p < .05$; secondary level $z = 2.33$, $p < .01$) than did those composing the engagement factor. The correlations of engagement and disengagement coping strategies at the primary and secondary levels of the CSI with home management and work subscales of the SIP were not found to be statistically significant. Overall, the correlations between coping strategies and the social maladjustment measures were

¹⁷Correlations were conservatively analyzed with two-tailed tests of significance, even though some of the hypotheses were directional in nature.

Table 16

Zero-order Correlations Between Coping Strategies at Time 1 and Outcomes at Three Time Points (*n* ranges from 89 to 220).

				Psychological distress (BSI)						Social maladjustment (SIP)								
				Home management						Social interaction						Work		
Scales	Time 1	H	SD	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3			
Coping strategies inventory (CSI)																		
Primary level:																		
Problem solving		13.90	9.17	-.01	.06	.06	-.04	-.07	-.06	.00	-.01	.01	.03	.02	.12			
Cognitive restructuring		13.00	7.88	.19**	.18*	.25***	.10	.06	.04	.11	.09	.11	.15	.15	.21*			
Express emotions		9.37	8.65	.10	.21**	.22**	.13	.13	.15*	.13	.19**	.13	.26*	.13	.32***			
Social support		7.84	7.34	.08	.04	.11	.17*	.02	.07	.03	.01	.01	.16	.10	.21*			
Problem avoidance																		
Wishful thinking		7.48	5.87	.27***	.37***	.37***	.24***	.09	.25***	.23***	.20**	.19*	.22*	.11	.22*			
Self-criticism		10.05	8.18	.28***	.43***	.36***	.30***	.12	.17*	.38***	.27***	.28***	.11	.16	.12			
Social withdrawal		6.22	8.60	.16*	.26***	.27***	.13	.20**	.11	.21**	.20**	.17*	.10	.21*	.07			
		7.27	6.81	.32***	.43***	.40***	.19**	.14	.10	.31***	.30***	.29***	.05	.10	.00			
Secondary level:																		
Problem engagement		26.91	15.22	.09	.13	.17*	.03	-.01	-.02	.05	.04	.06	.10	.08	.18			
Emotion engagement		17.21	13.69	.10	.16*	.19**	.17*	.09	.13	.09	.13	.08	.25*	.13	.30**			
Problem disengagement																		
Emotion disengagement		17.53	12.32	.32***	.46***	.42***	.31***	.13	.23**	.36***	.28***	.27***	.18	.16	.19			
		13.48	13.03	.28***	.40***	.39***	.19**	.20**	.13	.30***	.29***	.27***	.09	.19	.05			
Tertiary level:																		
Engagement		44.12	24.59	.11	.17*	.21**	.11	.04	.06	.09	.10	.08	.20	.12	.28**			
Disengagement		31.01	22.46	.33***	.49***	.46***	.28***	.19*	.20**	.37***	.32***	.30***	.15	.20*	.13			
Symptom management scale (SMS)																		
		6.36	2.95	.34***	.44***	.40***	.06	.00	-.02	.12	.17*	.08	.12	.18	.20*			

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 17

Zero-order Correlations Between Coping Strategies at Time 2 and Outcomes at Time 2 and 3 (n ranges from 107 to 199).

				Psychological distress (BSI)			Social maladjustment (SIP)					
Scales	Time 2	M	SD	Time 2	Time 3	Home management		Social interaction		Work		
						Time 2	Time 3	Time 2	Time 3	Time 2	Time 3	
Coping strategies inventory (CSI)												
Primary level:												
Problem solving		14.44	9.00	.13	.10	.01	.08	.05	.02	.05	.17	
Cognitive restructuring		12.60	7.93	.15*	.12	.06	.18*	.05	-.01	.19	.26*	
Express emotions		8.59	7.80	.19**	.14	.07	.17*	.15*	.11	.08	.22*	
Social support		8.04	7.62	.19**	.19*	.09	.33***	.11	.10	.09	.26*	
Problem avoidance												
Wishful thinking		5.99	4.99	.36***	.34***	.08	.25***	.20**	.20**	.17	.01	
Self-criticism		9.06	7.57	.46***	.38***	.12	.15	.27***	.19*	.14	.03	
Social withdrawal		4.72	6.96	.32***	.33***	.08	.08	.20**	.14	.15	.10	
		5.92	5.68	.56***	.50***	.17*	.17*	.42***	.41***	.15	.08	
Secondary level:												
Problem engagement		27.04	15.42	.15*	.12	.03	.14	.05	.01	.13	.24*	
Emotion engagement		16.64	13.78	.22**	.19*	.09	.28***	.14	.12	.09	.26*	
Problem disengagement												
Emotion disengagement		15.05	10.76	.49***	.42***	.12	.22**	.28***	.23**	.18	.03	
		10.64	10.48	.52***	.49***	.14	.14	.36***	.31***	.18	.11	
Tertiary level:												
Engagement		43.68	25.63	.21**	.17*	.07	.23**	.11	.07	.13	.28**	
Disengagement		25.69	18.41	.58***	.53***	.15*	.21**	.37***	.31***	.21*	.08	
Symptom management scale (SMS)												
		6.48	3.31	.53***	.47***	.08	.05	.30***	.22***	.21*	.23*	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 18

Zero-order Correlations Between Coping Strategies at Time 3 and Outcomes at Time 3 (*n* ranges from 92 to 190).

Psychological distress (BSI)				Social maladjustment (SIP)					
Scales	Time 3	M	SD	Time 3	Home management		Social interaction		Work
					Time 3	Time 3	Time 3	Time 3	
Coping strategies inventory (CSI)									
Primary level:									
Problem solving		14.03	9.16	.14	.07		-.04		.09
Cognitive restructuring		13.04	8.24	.23**	.13		.10		.20
Express emotions		9.09	8.74	.23***	.13		.07		.13
Social support		7.67	7.67	.32***	.19*		.04		.16
Problem avoidance									
Wishful thinking		6.79	5.53	.38***	.20*		.22**		.18
Self-criticism		9.03	7.49	.52***	.20*		.28***		.17
Social withdrawal		5.57	8.11	.27***	.06		.22**		.16
		6.14	6.22	.57***	.22**		.39***		.21*
Secondary level:									
Problem engagement		27.07	15.45	.20**	.11		.03		.16
Emotion engagement		16.76	14.45	.31***	.18*		.06		.17
Problem disengagement									
Emotion disengagement		15.82	11.47	.52***	.22**		.29***		.20
		11.71	11.98	.48***	.15		.36***		.21*
Tertiary level:									
Engagement		43.84	26.41	.29***	.17*		.05		.19
Disengagement		27.53	21.32	.55***	.21**		.35***		.23*
Symptom management scale (SMS)									
		6.65	3.19	.48***	.06		.23**		.27**

* $p < .05$ ** $p < .01$ *** $p < .001$

* $p < .05$ ** $p < .01$ *** $p < .001$

weaker than those between coping and psychological distress, and correlations significant at one time point were frequently not significant at another. Fewer significant correlations were found between coping strategies and the SIP subscale of work.

Psychological distress

Patients utilizing disengagement strategies (i.e., problem-avoidance, wishful thinking, self-criticism, and social withdrawal coping strategies) reported higher levels of distress at all three time points (see Tables 16, 17, 18). Although the correlations between wishful thinking and social withdrawal strategies with psychological distress appeared larger than the problem avoidance and self-criticism strategies, they were not found to be statistically different from each other. As previously stated, engagement coping had weaker and fewer significant positive correlations with psychological distress than did disengagement coping. The engagement coping strategies of cognitive restructuring, expressing emotions, and social support had significant positive correlations with psychological distress cross-sectionally and longitudinally, but only at certain time points. Patients utilizing symptom management coping strategies also reported higher levels of psychological distress at all three time points.

Social maladjustment in the domains of home management and social interaction

Disengagement coping had stronger, statistically significant, positive correlations with social interaction than did engagement coping which had weaker and fewer positive

correlations (see Tables 16, 17, 18) (primary level $z = 1.87$, $p < .05$; secondary level $z = 2.33$, $p < .01$). Although the correlations between disengagement coping strategies and home management appeared larger than the correlations with engagement coping strategies, they were not found to be statistically different from each other. Patients utilizing problem-avoidance, wishful thinking, and social withdrawal reported more deterioration in social interaction at all 3 time points, but less consistency was observed for home management functioning. Self-criticism was associated with impaired social interaction at two of three time points. The use of social support and expressing emotions were also correlated with deterioration in home management activities at certain time points. Symptom management coping was positively, but modestly, correlated with deterioration in social interaction at most time points, but was not associated with deterioration in home management activities.

Social maladjustment in the domain of work functioning

The coping strategies which were significantly correlated with work varied between the three time points. The use of engagement coping strategies was most frequently correlated with deterioration in work functioning, however so were some disengagement coping strategies. The use of cognitive restructuring, expressing emotions, and social support were associated with deterioration in work functioning, as were problem avoidance, self-criticism and social withdrawal at certain time points.

In summary, stronger, statistically significant, positive correlations were found between disengagement coping (e.g., social withdrawal) and psychological distress and social interaction than for engagement coping (e.g., social support). No significant differences were found between engagement or disengagement coping strategies and the home management and work subscales. Overall, the correlations between both coping factors and the 3 social maladjustment subscales were less consistent across time points than were those with psychological distress.

5.5 Objective 4: Description of Hassles

5.5.1 Research Question 3: Frequency, severity and intensity of stressors at the 3 time points

Differences in the three hassles scores (frequency, severity, and intensity) were examined across the three time points with Hotelling's T^2 .¹⁸ Pairwise comparisons of means were conducted to determine where differences occurred. The frequency of hassles was previously examined in objective 1; here, the severity and intensity scores are also included.

The three hassle scores were significantly different over time: frequency (Hotelling's $T^2 = 61.82$, $F_{(2, 181)} = 30.74$, $p < .001$); severity (Hotelling's $T^2 = 38.27$, $F_{(2, 181)} = 19.03$, $p < .001$); and intensity (Hotelling's $T^2 = 8.35$, $F_{(2, 181)} = 4.15$, $p < .02$). As

¹⁸The sample for this analysis included only those subjects who had frequency, severity, and intensity scores at all three time points. Consequently, the $n = 183$.

shown in Table 19, pairwise comparisons of means over time indicated that the frequency and severity of hassles decreased between *Times 1* and 2, and between *Times 1* and 3. For the intensity score, a significant decline occurred between *Time 1* and *Time 2*.

5.6 Objective 5: Description of Coping Strategies

5.6.1 Research Question 4: Description across time points of the focal stressors identified, the coping strategies used, and their relationship to each other

The focal stressor identified by patients was coded into the categories presented by Folkman et al. (1986) in their Stress Interview (e.g., family, finances, work, health, friendship, legal problems, maintenance [e.g., home, car], transportation, leisure, and other [e.g., losing keys, late for an appointment etc.]). An additional category of "conflict with strangers" was added because interpersonal conflict could be easily separated from the category "other". These stressors were further subdivided into cardiac or non-cardiac (e.g., cardiac-family, non-cardiac family etc.), based on the relationship of the focal stressor to either cardiac (e.g., "fight with my spouse regarding my limitations since my operation") or non-cardiac (e.g., "fight with my spouse over parking the car") concerns. Health items were coded as cardiac when the patient expressed concerns about his personal cardiac health (e.g., "worrying about my stress-test results"). Inter-rater reliability of categorizing the items was established by two independent raters classifying

Table 19

Changes in Mean Hassle Frequency, Severity, and Intensity Scores over Time ($n^b = 183$).

Variable	Pairwise Comparisons of Means ^c				M	SD
	Time 1	Time 2	Time 3			
Frequency						
Hotelling's $T^2 = 61.82^{***}$						
$F_{(2,181)} = 30.74$						
Time 1	---			23.77	13.97	
Time 2	7.35**	---		19.37	13.67	
Time 3	6.65**	.00	---	19.37	13.39	
Severity						
Hotelling's $T^2 = 38.27^{***}$						
$F_{(2,181)} = 19.03$						
Time 1	---			46.87	36.76	
Time 2	5.81**	---		37.05	35.69	
Time 3	5.45**	-.48	---	37.72	34.06	
Intensity						
Hotelling's $T^2 = 8.35^*$						
$F_{(2,181)} = 4.15$						
Time 1	---			1.84	.64	
Time 2	2.83*	---		1.73	.66	
Time 3	1.92	-.87	---	1.76	.64	

^a Following Hotelling's T^2 , t-tests were conducted to determine where differences occurred.

^b n was based on completing the Hassles and Concerns Scale at the three time points.

^c Two-tailed t-tests ($\alpha = .05$; .01) with Bonferroni alpha correction (comparison-wise $\alpha = .017$; .003, respectively).

* $p < .05$ ** $p < .01$ *** $p < .001$

each of the focal stressors at the three time points into the 22 possible cells (i.e., 2 [cardiac/non-cardiac] X 11 [family, finances, etc.]), with 13% of the subjects ($n = 28$). The raters consisted of a Ph.D. psychologist and the investigator. All 72 comparisons were in perfect agreement ($Kappa = 1.00$).

At *Time 1*, only 29% ($n = 56$) of patients' focal stressors were specifically cardiac in nature. At *Time 2*, 22% ($n = 38$) and at *Time 3*, 19% ($n = 30$) were cardiac-related. When cardiac stressors were identified, the most frequent category was health (10.8%); second was conflict with family members over cardiac issues (7.7%); and third was work concerns (3.6%) (see Table 20). In contrast, for non-cardiac stressors, family stressors were identified most frequently (28.2%), followed by work (15.9%). Non-cardiac health concerns accounted for only 2.1% (see Table 20).

Patients who experienced cardiac focal stressors were compared to patients who identified non-cardiac focal stressors on the type of coping strategies they utilized. The three levels of the CSI (tertiary, secondary, and primary) were examined. No significant differences were found between patients with cardiac and non-cardiac focal stressors on their use of engagement and disengagement (tertiary level) coping strategies, at *Time 1* (Hotelling's $T^2 = .01$, $F_{(2, 192)} = .86$, $p > .43$) and *Time 3* (Hotelling's $T^2 = .02$, $F_{(2, 156)} = 1.69$, $p > .19$) (see Tables 21 and 23). At *Time 2*, differences between the two groups approached significance (Hotelling's $T^2 = .03$, $F_{(2, 174)} = 3.03$, $p < .051$) (see Table 22). In examining pairwise comparisons among means, patients with cardiac stressors utilized more engagement coping strategies than patients with non-cardiac stressors. However,

Table 20

Frequencies of Cardiac^a and Non-cardiac Focal Stressors at the Three Time Points.

Focal Stressor	Time 1 (n = 195)			Time 2 (n = 177)			Time 3 (n = 159)		
	n	%	n	n	%	n	n	%	n
<u>Family</u>			70			52			46
Cardiac	15	7.7		8	4.5		6	3.8	
Non-cardiac	55	28.2		44	24.9		40	25.2	
<u>Finances</u>			13			11			17
Cardiac	3	1.5		3	1.7		5	3.1	
Non-cardiac	10	5.1		8	4.5		12	7.5	
<u>Work</u>			38			51			48
Cardiac	7	3.6		6	3.4		6	3.8	
Non-cardiac	31	15.9		45	25.4		42	26.4	
<u>Health</u>			25			25			13
Cardiac	21	10.8		18	10.2		9	5.7	
Non-cardiac	4	2.1		7	4.0		4	2.5	
<u>Friendship</u>			14			3			3
Cardiac	4	1.8		1	.6		1	.6	
Non-cardiac	10	5.1		2	1.1		2	1.3	
<u>Legal matters</u>			1			2			--
Cardiac	--	--		--	--		--	--	
Non-cardiac	4	.5		1	1.1		--	--	
<u>Maintenance</u>			11			9			12
Cardiac	4	2.1		1	.6		1	.6	
Non-cardiac	7	3.6		8	4.5		11	6.9	
<u>Transportation</u>			7			10			6
Cardiac	--	--		--	--		1	.6	
Non-cardiac	7	3.6		10	5.6		5	3.1	
<u>Leisure</u>			5			2			5
Cardiac	2	1.0		1	.6		1	.6	
Non-cardiac	3	1.5		1	.6		4	2.5	
<u>Conflict with strangers</u>			5			2			1
Cardiac	--	--		--	--		--	--	
Non-cardiac	5	2.6		2	1.1		1	.6	
<u>Other</u>			6			10			8
Cardiac	--	--		--	--		--	--	
Non-cardiac	6	3.1		10	5.6		8	5.0	

^a At Time 1 29% (n = 56) of patients' focal stressors were cardiac in nature, versus 22% (n = 38) at Time 2, and 19% (n = 30) at Time 3.

Table 21

Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 1 ($n = 195$).

	Engagement		Disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	40.93 (23.71)	45.40 (24.91)	31.59 (24.26)	30.78 (21.78)
	$t = -1.15$		$t = .23$	
	Problem engagement		Problem disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	26.08 (14.98)	27.27 (15.35)	16.86 (10.82)	17.80 (12.90)
	$t = -.52$		$t = -.48$	
	Emotion engagement		Emotion disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	14.91 (11.33)	18.14 (14.47)	14.73 (15.32)	12.98 (12.01)
	$t = -1.49$		$t = .85$	
	Cognitive restructuring		Problem avoidance	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	12.63 (8.23)	14.42 (9.51)	7.27 (5.46)	7.56 (6.04)
	$t = 1.24$		$t = -.32$	
	Express emotions		Wishful thinking	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	7.36 (7.10)	10.18 (9.09)	9.59 (7.14)	10.24 (8.58)
	$t = -2.08$		$t = -.50$	
	Social support		Self criticism	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	7.55 (6.56)	7.96 (7.64)	5.91 (8.48)	6.34 (8.68)
	$t = -.35$		$t = -.31$	
	Social withdrawal			
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	8.82 (8.43)	6.64 (5.96)		
	$t = 2.04$			

Note. Standard deviation is presented in parentheses. Two Tailed t-tests ($\alpha = .05$) with Bonferroni alpha correction.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 22

Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 2 ($n = 167$).

	Engagement		Disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	52.53 (28.36)	41.25 (24.57)	28.68 (20.82)	24.96 (17.72)
	$t = 2.42$		$t = 1.10$	
	Problem engagement		Problem disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	32.37 (17.25)	25.60 (14.72)	16.87 (12.24)	14.56 (10.28)
	$t = 2.42$		$t = 1.18$	
	Emotion engagement		Emotion disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	20.16 (14.71)	15.65 (13.50)	11.82 (11.91)	10.40 (10.13)
	$t = 1.79$		$t = .73$	
	Problem solving		Problem avoidance	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	17.16 (9.59)	13.73 (8.79)	7.00 (5.87)	5.76 (4.73)
	$t = 2.09$		$t = 1.36$	
	Cognitive restructuring		Unhelpful thinking	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	15.21 (8.82)	11.88 (7.61)	9.87 (8.24)	8.81 (7.35)
	$t = 2.31$		$t = .77$	
	Express emotions		Self criticism	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	9.26 (7.97)	8.42 (7.82)	5.13 (8.24)	4.67 (6.62)
	$t = .59$		$t = .36$	
	Social support		Social withdrawal	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	10.89 (8.11)	7.23 (7.36)	5.68 (5.84)	5.73 (5.66)
	$t = 2.66$		$t = .92$	

Note. Standard deviation is presented in parentheses. Two Tailed t-tests ($\alpha = .05$) with Bonferroni alpha correction.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 23

Mean Coping Scores and Significance Tests for Coping Strategies Inventory Levels by Cardiac and Non-Cardiac Stressors at Time 3 ($n = 159$).

	Engagement		Disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	44.30 (27.69)	43.22 (25.84)	21.50 (17.60)	28.78 (22.05)
	$t = .20$		$t = -1.69$	
	Problem engagement		Problem disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	26.60 (15.00)	26.96 (15.51)	11.70 (10.40)	16.64 (11.57)
	$t = -.12$		$t = -2.15$	
	Emotion engagement		Emotion disengagement	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	17.70 (14.89)	16.26 (14.20)	9.80 (9.28)	12.13 (12.60)
	$t = .50$		$t = -.95$	
	Cognitive restructuring		Problem avoidance	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	13.80 (9.30)	13.98 (9.13)	4.97 (5.46)	7.15 (5.50)
	$t = -.10$		$t = -1.96$	
	Express emotions		Wishful thinking	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	7.50 (7.11)	9.29 (8.94)	6.73 (5.85)	9.50 (7.76)
	$t = -1.03$		$t = -1.83$	
	Social support		Self criticism	
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	10.20 (8.93)	6.96 (7.23)	3.43 (4.98)	6.04 (8.66)
	$t = 2.11$		$t = -1.59$	
	Social withdrawal			
	Cardiac	Non-cardiac	Cardiac	Non-cardiac
	6.37 (6.69)	6.09 (6.17)		
	$t = .22$			

Note. Standard deviation is presented in parentheses. Two Tailed t-tests (alpha = .05) with Bonferroni alpha correction.

* $p < .05$ ** $p < .01$ *** $p < .001$

when the Bonferroni correction ($\alpha = .05 / 2 = .025$; Maxwell, 1980) was applied, this difference was no longer statistically significant. No differences were found between the groups in their use of disengagement coping.

No significant differences between the groups were found on the secondary level (i.e., in their use of problem-focused and emotion-focused engagement, or problem-focused and emotion-focused disengagement) at *Time 1* (Hotelling's $T^2 = .02$, $F_{(4, 190)} = .90$, $p > .47$), *Time 2* (Hotelling's $T^2 = .04$, $F_{(4, 172)} = 1.59$, $p > .18$), or *Time 3* (Hotelling's $T^2 = .05$, $F_{(4, 154)} = 1.91$, $p > .11$). No significant differences were found on the primary level of coping strategies (i.e., problem-solving, cognitive restructuring, express emotions, social support, problem avoidance, wishful thinking, self-criticism, and social withdrawal) at *Time 2* (Hotelling's $T^2 = .07$, $F_{(8, 168)} = 1.53$, $p > .15$). *Time 1* comparisons approached significance (Hotelling's $T^2 = .08$, $F_{(8, 186)} = 1.92$, $p > .06$), on the other hand, at *Time 3*, significant differences were found (Hotelling's $T^2 = .14$, $F_{(8, 150)} = 2.63$, $p < .01$). When pairwise comparisons of means were made at *Time 1*, patients who identified a cardiac focal stressor utilized more social withdrawal coping strategies, whereas patients who identified a non-cardiac focal stressor used more expression of emotions. At *Time 3*, patients who identified a cardiac focal stressor utilized more social support coping strategies. However, these differences were no longer statistically significant after the Bonferroni correction ($\alpha = .05 / 8 = .006$; Maxwell, 1980) was applied.

5.7 Objective 6: Effects of Participation in the Cardiac Rehabilitation Program on Personal Mastery, Kilocalorie Expenditure, Number of Hassles, and Coping Variables

Given the consistency with which personal mastery, kilocalorie expenditure, number of hassles and coping were found to predict psychological distress and in some regressions they also predicted social maladjustment, follow-up analyses were conducted to examine whether the amount of participation in the cardiac rehabilitation program could account for the changes in those predictors. Separate hierarchical multiple regression analyses were conducted for each variable, to determine whether any or all of them appeared to be influenced by participation in the program. In order to maximize the potential effects of the rehabilitation program (i.e., to test the maximum dose of treatment), the relationship between the predictor variables at *Time 1* and the outcomes at *Time 3* were examined. Program participation was operationalized as the total number of sessions attended in the rehabilitation program (i.e., the sum of the number of sessions attended in each of the different services).

The following hierarchical entry of variables was used with each equation. First, the outcome variable at *Time 1* was entered as a predictor, to control for the initial level of the dependent variable being analyzed. This procedure generates a residualized change score. Second, demographic variables (age, education, marital status, employment status) were entered as a block. Education, marital status and employment status were entered as dummy variables, as before (see Section 5.3). Personal mastery

was entered next, followed by cardiac functional capacity as measured by kilocalorie expenditure. Then the frequency (number) of hassles was entered, followed by the block of coping variables (engagement, disengagement, and symptom management). The psychosocial variables (psychological distress as measured by the BSI and the two SIP subscales potentially available on all subjects [home management and social interaction]) were entered as a block because there was no *a priori* grounds for their order. Finally, program participation was entered. The net incremental contribution of program participation was thus assessed after the patients' baseline (*Time 1*) status on all of the predictors had been taken into account.

All patients who had returned the questionnaire packages at *Time 1* and *Time 3*, and who had completed the coping questionnaire and provided data on the dependent variable in question were included in the regression analyses. Due to missing data, each regression analysis had a different sample size.

5.7.1 Research Question 5: Prediction of personal mastery

In the prediction of personal mastery at *Time 3*, statistically significant increments in R^2 were added by the following *Time 1* variables (see Table 24): initial personal mastery, kilocalorie expenditure, number of hassles, and psychosocial variables. Beyond *Time 1* personal mastery, the model explained an additional 9% of the variance in *Time 3* personal mastery. Although program participation at *Time 3*, had no incremental

Table 24

Hierarchical Multiple Regression of Personal Mastery (Time 3) on Personal Mastery, Demographic Variables, Kilocalorie Expenditure, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 179).

Block Variables	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 personal mastery	.64***	.64***	.41	.41***	122.50***
2 <u>Demographic variables</u>					
Age	.06				
Education ^b	.03				
Marital status ^b	-.08				
Employment status ^b	-.01	.65***	.42	.01	.65
3 Kilocalorie expenditure	.13*	.66***	.43	.02*	4.59*
4 Number of hassles	-.20**	.68***	.46	.03**	10.19**
5 <u>Coping variables</u>					
Engagement	.04				
Disengagement	-.16*				
Symptom management	.02	.70***	.48	.02	2.12
6 <u>Psychosocial variables</u>					
Psychological distress (BSI)	-.25***				
SIP subscales: Home management	.10				
Social interaction	-.09	.72***	.52	.04**	4.34**
7 Program participation	.09	.73***	.53	.01	2.23
<u>Total equation</u>			R ² = .53 F _(14,164) = 13.13*** Mean of DV = 27.48 SD = 5.56		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

effect on personal mastery, this is a crude measure and does not clearly reflect the nature of the interventions received.

The beta coefficients for the significant variables in the equation provide information on their relative relationship to the outcome variables. The results suggest that patients who began their cardiac rehabilitation program with higher kilocalorie expenditure ($\beta = .13$), fewer hassles ($\beta = -.20$), and lower psychological distress ($\beta = -.25$) had higher personal mastery at *Time 3*. Although, the coping block was not significant, lower scores on disengagement coping variable ($\beta = -.16$) also predicted lower personal mastery.

5.7.2 Research Question 5: Prediction of kilocalorie expenditure

In the prediction of *Time 3* kilocalorie expenditure (i.e., cardiac functional status at the end of the end of the program) from the *Time 1* predictors, statistically significant increments in R^2 were added by the following variables (see Table 25): initial kilocalorie expenditure, personal mastery, number of hassles, and psychosocial variables. The model, beyond *Time 1* kilocalorie expenditure explained an added 16% of the variance in *Time 3* kilocalorie expenditure.

The beta coefficients for this equation suggest that patients with higher personal mastery ($\beta = .22$), fewer hassles ($\beta = -.22$), lower psychological distress ($\beta = -.20$), and fewer changes in the domain of home management ($\beta = -.27$) at *Time 1* had higher kilocalorie expenditure at *Time 3*.

Table 25

Hierarchical Multiple Regression of Kilocalorie Expenditure (Time 3) on Kilocalorie Expenditure, Demographic Variables, Personal Mastery, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 137).

Block Variables	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 kilocalorie expenditure	.45***	.45***	.20	.20***	33.69***
2 <u>Demographic variables</u>					
Age	-.16				
Education ^b	.03				
Marital status ^b	.08				
Employment status ^b	.00	.48***	.23	.03	1.16
3 Personal mastery	.22**	.52***	.27	.05**	8.20**
4 Number of hassles	-.22*	.56***	.31	.04*	6.60*
5 <u>Coping variables</u>					
Engagement	-.07				
Disengagement	.15				
Symptom management	.10	.57***	.33	.02	1.37
6 <u>Psychosocial variables</u>					
Psychological distress (BSI)	-.20				
SIP subscales: Home management	-.27**				
Social interaction	.13	.63***	.40	.07**	4.88**
7 Program participation	.09	.64***	.41	.01	1.41
<u>Total equation</u>					
R ² = .41					
F _(16,122) = 6.02***					
Mean of DV = 125.76					
SD = 33.84					

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

An additional regression was performed to discover whether the number of physiotherapy sessions would be a better predictor of kilocalorie expenditure than program participation as a whole. The goal of physiotherapy at HIPRC is to improve cardiac functional capacity through bi-weekly exercise. As can be seen from Table 26, physiotherapy did, in fact, account for an additional 3% of the variance in kilocalorie expenditure, over and above the other predictors. Patients who attended exercise class more frequently had higher kilocalorie expenditure, i.e., better cardiac functional capacity ($\beta = .20$).

5.7.3 Research Question 5: Prediction of number of hassles

In the prediction of the frequency (number) of hassles at the end of the program, statistically significant increments in R^2 were added by the following variables (see Table 27): initial number of hassles, personal mastery, the psychosocial variables, and program participation. Beyond *Time 1* number of hassles, the model explained an added 5% of the variance in *Time 3* number of hassles. The results suggested that patients with lower personal mastery ($\beta = -.12$) and higher psychological distress ($\beta = .19$) at *Time 1*, and who attended fewer program sessions ($\beta = -.14$) at *Time 3*, experienced more hassles (i.e., had more chronic stress) at *Time 3*.

Table 26

Hierarchical Multiple Regression of Kilocalorie Expenditure (Time 3) on Kilocalorie Expenditure, Demographic Variables, Personal Mastery, Number of Hassles, Coping Variables, Psychosocial Variables (Time 1), and Physiotherapy (Time 3) (n = 137).

Block Variables	β^a	R	R^2	ΔR^2	ΔF
1 Time 1 kilocalorie expenditure	.45***	.45***	.20	.20***	33.69***
2 Demographic variables					
Age	-.16				
Education ^b	.03				
Marital status ^b	.08				
Employment status ^b	.00	.48***	.23	.03	1.16
3 Personal mastery	.22**	.52***	.27	.05**	8.20**
4 Number of hassles	-.22*	.56***	.31	.04*	6.60*
5 Coping variables					
Engagement	-.07				
Disengagement	.15				
Symptom management	.10	.57***	.33	.02	1.37
6 Psychosocial variables					
Psychological distress (BSI)	-.20				
SIP subscales: Home management	-.27**				
Social interaction	.13	.63***	.40	.07**	4.88**
7 Physiotherapy	.20**	.66***	.44	.03**	7.17**
Total equation			$R^2 = .44$ $F_{(14,122)} = 6.70***$		
			Mean of DV = 125.76 SD = 33.84		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 27

Hierarchical Multiple Regression of Number of Hassles (Time 3) on Number of Hassles, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Coping Variables, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 178).

Block Variables	β^a	R	R^2	ΔR^2	ΔF
1 Time 1 number of hassles	.78***	.78***	.61	.61***	271.34***
2 <u>Demographic variables</u>					
Age	.04				
Education ^b	.02				
Marital status ^b	.05				
Employment status ^b	.08	.78***	.62	.01	1.06
3 Personal mastery	-.12*	.79***	.63	.01*	5.10*
4 Kilocalorie expenditure	-.03	.79***	.63	.00	.29
5 <u>Coping variables</u>					
Engagement	.03				
Disengagement	.07				
Symptom management	.04	.80***	.63	.01	1.04
6 <u>Psychosocial variables</u>					
Psychological distress (BSI)	.19**				
SIP subscales: Home management	-.05				
Social interaction	-.03	.81***	.66	.02*	3.49*
7 Program participation	-.14**	.82***	.67	.02**	7.65**
<u>Total equation</u>			$R^2 = .67$ $F(14, 163) = 23.84***$ Mean of DV = 19.84 SD = 13.36		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

5.7.4 Research Question 5: Prediction of coping strategies

In the prediction of engagement coping at *Time 3* from the *Time 1* predictors, statistically significant increments in R^2 were added by the following variables (see Table 28): initial engagement coping and number of hassles. Similarly, for symptom management coping, initial coping and number of hassles were significant (see Table 30). For disengagement coping, only initial coping was significant (see Table 29). However, within the block of psychosocial variables, psychological distress was also significant. In no case did program participation add a significant increment to the prediction of coping strategies.

Greater use of engagement and symptom management coping at *Time 3* was predicted by having a greater number of hassles ($\beta = .21$; $\beta = .18$, respectively) at *Time 1*. Reliance on disengagement coping was predicted by higher psychological distress ($\beta = .21$) at *Time 1*.

Table 28

Hierarchical Multiple Regression of Engagement Coping (Time 3) on Engagement Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 154).

Block Variables	β^a	R	R^2	ΔR^2	ΔF
1 Time 1 engagement coping	.52***	.52***	.27	.27***	56.59***
2 Demographic variables					
Age	.04				
Education ^b	-.01				
Marital status ^b	-.01				
Employment status ^b	.06	.52***	.28	.00	.21
3 Personal mastery	.03	.53***	.28	.00	.16
4 Kilocalorie expenditure	.05	.53***	.28	.00	.46
5 Number of hassles	.21*	.56***	.31	.03*	6.34*
6 Psychosocial variables					
Psychological distress (BSI)	-.12				
SIP subscales: Home management	-.03				
Social interaction	-.08	.57***	.33	.02	1.25
7 Program participation	-.06	.57***	.33	.00	.75
Total equation			$R^2 = .33$ $F_{(12,141)} = 5.79***$		
			Mean of DV = 44.55 SD = 26.48		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 29

Hierarchical Multiple Regression of Disengagement Coping (Time 3) on Disengagement Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 154).

Block Variables	β^a	R	R^2	ΔR^2	ΔF
1 Time 1 disengagement coping	.54***	.54***	.29	.29***	61.97***
2 <u>Demographic variables</u>					
Age					
Education ^b	.05				
Marital status ^b	-.08				
Employment status ^b	-.02				
	.01	.55***	.30	.01	.48
3 Personal mastery	-.04	.55***	.30	.00	.24
4 Kilocalorie expenditure	.06	.55***	.30	.00	.60
5 Number of hassles	.09	.55***	.31	.00	1.05
6 <u>Psychosocial variables</u>					
Psychological distress (BSI)	.21*				
SIP subscales: Home management	-.05				
Social interaction	-.08	.58***	.34	.03	1.94
7 Program participation	-.12	.59***	.35	.01	2.64
<u>Total equation</u>			$R^2 = .35$ $F_{(12,141)} = 6.25***$ Mean of DV = 28.04 SD = 21.55		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 30

Hierarchical Multiple Regression of Symptom Management Coping (Time 3) on Symptom Management Coping, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles, Psychosocial Variables (Time 1), and Program Participation (Time 3) (n = 179).

Block Variables	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 symptom management coping	.65***	.65***	.42	.42***	130.01***
2 <u>Demographic variables</u>					
Age	-.14*				
Education ^b	.01				
Marital status ^b	.04				
Employment status ^b	.03	.67***	.45	.02	1.78
3 Personal mastery	-.01	.67***	.45	.00	.05
4 Kilocalorie expenditure	.03	.67***	.45	.00	.19
5 Number of hassles	.18*	.68***	.47	.02*	6.49*
6 <u>Psychosocial variables</u>					
Psychological distress (BSI)	.15*				
SIP subscales: Home management	.08				
Social interaction	.00	.70***	.49	.02	2.04
7 Program participation	-.07	.70***	.49	.00	1.34
<u>Total equation</u>			R ² = .49 F _(12,166) = 13.31 Mean of DV = 6.83 SD = 3.15		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

6. DISCUSSION

This discussion addresses the specific study hypotheses, the research questions, study strengths and limitations, and implications for research and clinical intervention.

6.1 Hypotheses

Given the importance of studying change in psychological distress and social maladjustment among patients between the beginning and the end of the rehabilitation program, the results between *Time 1* and *Time 3* are emphasized. The analyses involving change between *Time 1* and *Time 2* and between *Time 2* and *Time 3* are discussed in the context of the replicability (generalizability) of the regression models; that is, are the same variables that are predictive of change over the entire 6-month program also predictive over the first 3-month segment and over the second?

6.1.1 Hypothesis 1: Prediction of psychological distress

As hypothesized, in the prediction of psychological distress at *Time 3*, and controlling for psychological distress at *Time 1*, demographic variables, personal mastery, and cardiac functional capacity (kilocalorie expenditure) at *Time 1*, both the number of hassles and the block of coping variables contributed significant increments to the

variance explained for both *Models A* and *B*¹⁹. These findings were replicated for number of hassles between *Time 1* and *Time 2* and *Time 2* and *Time 3* for both *Models A* and *B*, and for the coping block between *Time 1* and *Time 2* (*Models A* and *B*) and *Time 2* and *Time 3* (*Model B*).

In this study, patients' reliance on disengagement coping was found to be consistently predictive of psychological distress across the models and time points (the only exception being *Model A; Time 1* and *Time 3*). These results are supported by Billings and Moos (1981) and Folkman and Lazarus (1988) who found that individuals utilizing "avoidance" or "distancing" coping strategies experienced worsened emotional states. More broadly, the present findings are consistent with findings that grieving subjects utilizing disengagement coping experienced higher levels of depression, somatization, and perceived stress (Chartier, 1989), that MI and cancer patients rated as "adjusting well" minimized their use of avoidance coping styles (Feifel et al., 1987), and that individuals who adapted to stress without physical or emotional strain used fewer avoidant coping responses (Holahan and Moos, 1985).

Contrary to our hypothesis, however, higher levels of engagement and symptom management coping were not significant predictors of lower psychological distress in this study. In fact, engagement coping was found to be predictive of higher distress between *Time 1* and *Time 3* (*Model B*), and symptom management coping was found to be predictive of higher distress between *Time 1* and *Time 2* (*Models A* and *B*), respectively.

¹⁹*Model A* utilized coping strategies entered at the time point prior to the outcome measurement, and *Model B* utilized coping strategies entered at the same time point as the outcome measurement.

This runs counter to previous findings that greater reliance on active coping strategies is usually associated with less symptomatology (Billings & Moos, 1981; Holahan & Moos, 1985; Kobasa, 1982; Schill et al., 1984). These findings for engagement and symptom management coping, moreover, were not consistent between all time points, suggesting that they may be less stable.

Other significant and nonsignificant findings, which were less central to this thesis, but deserve attention, are the roles of personal mastery, kilocalorie expenditure, and some of the demographic variables as predictors of psychological distress. Higher personal mastery was significantly predictive of lower psychological distress in all of the regression models. This is consistent with the findings of Pearlin, Menaghan, Lieberman, and Mullan (1981), Turner et al. (1983), Waltz (1986), and Folkman et al., (1986), who found that lower personal mastery predicted higher psychological distress. Similarly, Pearlin and Schooler (1978) found that higher personal mastery helped to diminish the impact of persistent problems.

Kilocalorie expenditure, a measure of cardiac functional capacity, was found here not to be significantly related to psychological distress in any of the regressions. This is consistent with the work of Bruce et al. (1983-84), Trelawny-Ross and Russell (1987), and Wiklund et al. (1984), who found that the severity of heart disease did not emerge as a predictor of psychological distress. These data do not appear to support the view that cardiac patients who are more physically disabled will be in more distress, however it remains possible that such an effect was masked by the ordering of the variables in the regression equations. Apparently, level of physical disability, as measured by cardiac

functional capacity, provides much less predictive information (vis-à-vis the outcome of psychological distress) than do cognitive and behavioural variables.

The only demographic variable that predicted psychological distress was a lower level of education; however, this was only found between *Time 2* and *Time 3*. Age was not found to be predictive of higher distress in any of the analyses, which differed from the Stern et al. (1977) finding that younger patients were more likely to be depressed. This discrepancy may be due in part to that study's measurement of specific syndromes (i.e., depression and anxiety), as opposed to the general distress measure employed in this study.

Across the 3 time points for both *Models A* and *B*, the most consistent predictors of psychological distress are personal mastery, number of hassles, and the block of coping variables. Number of hassles explained 3% to 7% of the variance in psychological distress after controlling for the other independent variables. This implies that stress prevention would be an important factor to target in cardiac rehabilitation programs. Disengagement coping, and to a lesser extent symptom management coping, were found to predict psychological distress explaining 3% to 9% of the variance. The betas for disengagement coping ranged between .14 to .25, and for symptom management coping the range was .11 to .18. Teaching patients how to decrease the use of disengagement and symptom management coping strategies might be beneficial. A lower sense of personal mastery consistently predicted psychological distress, and accounted between 2% to 3% of the variance with betas ranging from -.16 to -.18. Increasing patients' sense of personal mastery may help decrease psychological distress. The R^2 for the total

equation in predicting psychological distress (*Time 1* to *Time 3*) indicates that a good fit was achieved using the chosen predictors. The percentage of variance explained for *Model A* was 66% and for *Model B* was 75%.

The utility of examining coping using two different regression models, (i.e., *Models A* and *B*), is illustrated by comparing the strength of the incremental R^2 in each equation. When coping was entered at the same time point as the outcome measurement (*Model B*), stronger relationships between coping strategies and the outcome measure emerged than when coping was entered at the time point prior to the outcome measure (*Model A*). Theoretically, this appears to support Lazarus and Folkman's (1984) contention that coping strategies are used in situationally specific ways. Thus, *Model A* would be expected to be less predictive because coping is measured in a context more distant from the adjustment outcome. Although *Model B* was found to be more predictive of psychological distress, it may be more confounded with this outcome given their concurrent measurement. Statistical concerns aside, assessing a patient's coping in relation to stressors on an ongoing basis during rehabilitation may maximize identification of strategies which are associated with adjustment difficulty. Surprisingly, although cognitive social learning theory (Bandura, 1982; 1986) stresses the importance of measuring mediating variables at time points proximal to outcomes, this has been the first study to have examined the difference between proximal and distal measures of coping predictors in relation to outcome using Lazarus and Folkman's (1984) model. Future research on the differential explanatory power of time-based equations would

help refine our understanding of the relative stability of mediators and enhance prediction.

6.1.2 Hypothesis 2: Predicting social maladjustment

In general, neither stress nor coping emerged as consistent predictors of social maladjustment across time points for either *Models A* and *B*. Given the low magnitude of the bivariate correlations between the coping and the SIP variables, it is not surprising that coping was not predictive of social maladjustment in the regression analyses. The hypothesized predictors are discussed below for each SIP subscale.

Home management

Although the hypothesis that a higher number of hassles would predict more dysfunction in home management was partially supported, the hypotheses concerning the role of coping were not. Number of hassles predicted dysfunction in home management between *Time 1* and *Time 3* (*Model B*), and between *Time 2* and *Time 3* (*Models A* and *B*). Neither disengagement nor symptom management coping were found to be significant predictors in any of the regressions. In addition, contrary to the hypothesis that engagement coping would be negatively related to changes in home management activity, it was actually found to predict a higher level of maladjustment in one regression (*Time 2* to *Time 3*; *Model A*). There are at least two alternative explanations for this finding. First, because this finding was not replicated in the other regressions, the observed relationship may be relatively unstable. Second, because age (*Time 1* to *Time*

3) and kilocalorie expenditure (*Time 1* to *Time 2*) were significant predictors of dysfunction in home management, this subscale may be tapping "ability to live independently" rather than "social functioning". That is, patients who are older or who have lower kilocalorie expenditure (i.e., who have poorer cardiac functional capacity) tend to reduce their level of home management activity more than others. The finding that older patients do not resume domestic activities as easily as others is consistent with the findings of Mayou et al. (1978).

Employment status was also found to predict changes in home management activity from the beginning to the end of the program. Patients who were employed experienced a deterioration in home management activity. It may be that cardiac rehabilitation patients who have returned to work do not have the additional stamina to do household chores. If the home management subscale truly reflects functional capacity, it is reasonable that cognitively-oriented coping strategies employed by patients would be unrelated to it.

Social interaction

Number of hassles did not predict changes in social interaction between any of the time points. The block of coping variables, however, contributed significant increments to the variance explained in social interaction. At all three time points (*Model B*), high scores on disengagement coping predicted dysfunction in the area of social interaction (i.e., patients utilizing disengagement strategies experienced greater problems in social interaction with family and friends). This is consistent with previous

findings indicating that worsened family and marital relationships are associated with the patient's emotional withdrawal from others and decreased communication (Sikorski, 1985; Stern & Pascale, 1979). The hypothesis that more engagement and symptom management coping would result in less dysfunction in social interaction was not substantiated.

Personal mastery did predict dysfunction in social interaction between *Time 1* and *Time 3 (Models A and B)*. Those who were less confident that they could mobilize their personal resources to deal with environmental stressors experienced more impairment in social interaction.

Work Functioning

The hypothesis that a greater number of hassles, more engagement and less disengagement coping would predict fewer negative changes in work functioning received no support. However, other variables were significant predictors. Reduced work functioning was predicted by lower cardiac functional capacity (kilocalorie expenditure) between *Time 1* and *Time 2*. This is consistent with Brammell (1981), Jenkins et al. (1983), and O'Connor (1983) who noted that a proportion of cardiac patients required modification of job tasks or needed to reduce the number of hours worked. Lower functional capacity and lower personal mastery predicted compromised work functioning during the first and second halves of the program, respectively. This suggests that a decline in work functioning may initially be related to physical deconditioning; however, once patients are in better physical condition, lower personal mastery may prevent them

from achieving premorbid levels of work activity. It should also be noted that these findings were based on a sub-sample of these patients (i.e., only those who were working at a given time point); statistical power is thus lower than for the other dependent variables.

The R^2 for the total equation in predicting home management, social interaction and work (*Time 1* to *Time 3*) indicates that only a moderate fit was achieved using the chosen predictors. The percentage of variance explained ranged from 31% to 47%. This suggests that other, unmeasured, variables may be equally important in predicting the social adjustment of cardiac patients. Another possible explanation for lack of fit concerns the distribution of SIP scores, which were generally low and of limited variability. Consequently, the correlations with the predictors may have been attenuated. One factor contributing to this is the SIP's reliance on a *true/false* response option format, indeed, a floor effect was observed for this measure: the mean SIP scores ranged from 1.24 to 1.66, suggesting that patients only endorsed 1 to 2 items out of 7 to 10 items. Ott, Sivarajan, Newton, Almes, Bruce, Bergner, et al. (1983) utilized the entire SIP with MI patients and found that most patients had recuperated by 3 months post-discharge, resulting in minimal impairment scores on the SIP. Given that the patients in the present sample entered the rehabilitation program an average of 5 months post-event, their recuperation level may have been relatively high explaining the low endorsement of items. Ott et al. (1983) also found the SIP to be sensitive in differentiating change between groups of cardiac patients receiving different treatments; however, it may not be sensitive enough to predict changes within a group. Because of

the above noted problems with this scale, interpretation regarding the factors influencing social adjustment must be made cautiously. Other measures of social adjustment, such as marital, family, or friendship adjustment, would have possibly improved the fit of the model. One limitation of research on social adjustment is the lack of standardized measures. Scale selection is problematic due to the fact that some adjustment scales (e.g., the Social Adjustment Scale by Weissman & Bothwell, 1979) have been found to be highly correlated with psychological distress (Cazabon, 1984) and therefore lack discriminant validity. As with psychological distress *Model B* explained more variance than *Model A*, however only for social interaction, as coping was not found to be significant for home management or work functioning.

6.2 Research Questions

In order to investigate objectives that were descriptive in nature, *a priori* research questions were pursued. The answers to such research questions help generate hypotheses for future research.

6.2.1 Research question 1: Mean differences across time points among the variables

The stability of the key dependent and independent variables across the 3 time points was examined in order to determine when the most important changes occurred during the rehabilitation program. The personal mastery mean scores did not significantly differ over the 3 time points. Personal mastery is conceptualized as a personality characteristic that acts as a resource that buffers the effects of stress; it is

expected to remain fairly stable (Pearlin & Schooler, 1978; Revenson & Felton, 1989). In most studies, personal mastery is considered as a dispositional characteristic and is measured only once (Pearlin & Schooler, 1978; Folkman et al., 1986). This finding suggests that this assumption of high stability is well founded, as neither the rehabilitation program nor the process of recovery exerted an influence on mastery.

Kilocalorie expenditure significantly increased between the 3 time points. This supports the key cardiac rehabilitation goal of improving patients' physical condition. The number of hassles significantly decreased between *Time 1* and *Time 2* and between *Time 1* and *Time 3*. In contrast, Kanner et al. (1981) found that the frequency of hassles was fairly consistent across several time points; this inconsistency among findings will be examined in more detail in Research question 5. Engagement and symptom management scores remained fairly stable across time, whereas disengagement decreased significantly between *Time 1* and *Time 2*, and between *Time 1* and *Time 3*. The reduction in number of hassles and disengagement coping are clinically important and it is noteworthy that these reductions occurred most significantly during the first half of the program. Possible reasons for this are discussed in relation to the findings in Research question 5. Perhaps as patients gain experience with the demands of their illness, the need to employ disengagement is reduced. There may be a "natural history" of coping responses in which initial levels of disengagement drop off over time. It would be interesting to attempt to replicate this in other chronic illness samples. As can be seen in Table 5, the mean scores for engagement coping were higher (means ranged from 44.16 to 45.13) than those for disengagement coping scores (means ranged from 26.41 to

31.79). This is consistent with Holahan and Moos (1985) and Nicholson (1989), who found that avoidant coping was used proportionately less often than approach coping.

Psychological distress also decreased between *Time 1* (mean level of distress = 56.53) and *Time 3* (mean = 54.98). It is plausible that because program participation directly reduced number of hassles, and that number of hassles was directly related to psychological distress, that program participation has an indirect relationship to psychological distress to the degree that it reduces hassles. The SIP scores for home management and social interaction decreased significantly between *Time 1* and *Time 2* and *Time 1* and *Time 3*, but scores in work functioning remained fairly stable (decreases between *Time 1* and *Time 2* and *Time 1* and *Time 3* were not statistically significant). It appears that it was more difficult for patients to make vocational as opposed to domestic or interpersonal improvements. The smaller subsample in this analysis may account for the lack of significant differences, while patients continue to make gains in functional capacity up to 6 months.

From these analyses, it is apparent that changes are most likely to occur during the first half of the cardiac rehabilitation program. Scores tended to be maintained between *Time 2* and *Time 3*, with the exception of kilocalorie expenditure, which continued to increase. This suggests that the rehabilitation program had the most psychological and social impact during the first three months of treatment. However, in the absence of a control group it is impossible to separate out the effects of time or maturation.

6.2.2 Research question 2: Correlations between the Coping Strategies Inventory, Symptom Management Scale, psychological distress, and social maladjustment at the 3 time points

The maintenance of statistical power and avoidance of multicollinearity between variables precluded examining the primary and secondary levels of the CSI in the hierarchical multiple regression analyses. However, the information from the bivariate correlations at these levels can still provide a means of comparing the present results with those of other studies and suggesting directions for future research. The bivariate correlations are to be found in Tables 16, 17, 18.

Examining the relationship between coping strategies and outcome variables such as psychological distress and social maladjustment can also provide potentially useful information on the relative beneficial or detrimental effects of specific coping strategies. The inferences made here, however, must be regarded as speculative, given that they are based on zero-order correlations only (i.e., other variables were not been statistically controlled).

The bivariate correlations between the three levels of the CSI, SMS, and the outcome variables of psychological distress (BSI) and social maladjustment (SIP) were examined both cross-sectionally and longitudinally. The use of disengagement coping strategies was consistently associated with greater psychological distress and with poorer adjustment on the SIP domains of social interaction and, to a lesser extent, home management. Engagement coping had weaker and fewer significant positive correlations with psychological distress and social interaction. However, engagement coping

strategies were relatively more frequently positively correlated with compromised work functioning. More specifically, the disengagement coping strategies of problem-avoidance, wishful thinking, social withdrawal, and, to a lesser extent, self-criticism had stronger positive correlations with psychological distress at all three time points than did the micro-level strategies making up the engagement factor. These findings are consistent with those of Folkman et al. (1986), and Folkman and Lazarus (1988) who observed, in a "normal" community sample, that the "distancing" coping strategy was related to unsatisfactory outcomes and worsened emotional states. Similarly, Aldwin and Revenson (1987) found that "escapism" and "self-blame" coping strategies were related to greater emotional distress, and Vitaliano et al. (1989) found that chest pain patients who were clinically depressed had higher scores on wishful thinking and lower scores on seeking social support than those without psychiatric disorders. A number of other studies have also found that reliance on wishful thinking, self-blame, and emotional expression is associated with poorer psychological adjustment (Vitaliano et al., 1987; Felton et al., 1984; Revenson & Felton, 1989).

Contrary to expectation, the engagement-coping strategies of problem solving, cognitive restructuring, expressing emotions, and social support seeking were not negatively related to psychological distress. In fact, cognitive restructuring, express emotions and seeking social support had positive, although low, correlations with psychological distress in this sample. The lower correlations between engagement coping and psychological distress explain why engagement coping did not emerge as a significant predictor in the regression analyses. These findings differ from those of Vitaliano et al.

(1987), Folkman et al., (1986), Folkman and Lazarus (1988), and Revenson and Felton (1989) for whom problem-solving and positive reappraisals (constructs similar to cognitive restructuring) were associated with more satisfactory outcomes, including improved emotional states. In this study, distress was consistently more strongly associated with disengagement than with engagement. This suggests that intervention efforts might best be directed toward helping cardiac patients identify, and use fewer, disengagement coping strategies.

Fewer and lower correlations were found between home management and coping strategies. In linking the correlation matrices and the regression models, in only one regression analysis did the block of coping variables predict greater impairment in home management. That variable was engagement coping, which, counterintuitively, appeared to increase maladjustment. Low positive correlations with home management were found at some of the time points between the emotion-engagement strategies of seeking social support and expressing emotions. Seeking social support had the strongest correlation, suggesting that patients may be seeking others' support or help in completing household activities. The consequences of this may well be to reduce patient's perceptions of efficacy and reinforce their dependence on others for simple activities of daily living (Hotz, Cazabon, O'Farrell, & Robbins, in press). The use of disengagement coping (i.e., problem-avoidance and wishful-thinking strategies) was found to have modest positive correlations with impairments in home management; however, this was not observed at all time points.

As in the case of psychological distress, the disengagement coping strategies of problem-avoidance, wishful thinking, self-criticism, and social withdrawal were consistently positively correlated with greater difficulties in social interaction. This is consistent with Keller's (1988) finding that rehabilitation patients utilizing palliative coping, defined as avoiding the problem, or withdrawing from the situation, had higher dysfunction scores on the full-scale SIP.

6.2.3 Research question 3: Frequency, severity and intensity of stressors at the three time points

The frequency and severity of hassles decreased significantly between *Time 1* and *Time 2*, and *Time 1* and *Time 3*, and the intensity of hassles decreased significantly between *Time 1* and *Time 2*. The average intensity of stressors experienced was approximately 2 (on a scale of 0 - 4), which corresponds to the descriptor "somewhat stressful" level. Given that the items and the descriptors of the Hassles and Concerns scale were modified, the frequency, severity and intensity scores cannot be compared with the norms of Kanner et al. (1981).

6.2.4 Research question 4: Description across time points of the focal stressors identified, the coping strategies used, and their relationship to each other

Approximately 30% of patients identified cardiac-related focal stressors at the beginning of the program, and this decreased to approximately 20% by the end of the program. Among cardiac stressors, those relevant to health were most frequently

endorsed; next were conflicts with family members over cardiac issues; and third were work concerns. In contrast, among non-cardiac stressors, family stressors were identified most frequently, followed by work. Although it appeared that differences in the use of coping strategies existed for cardiac versus non-cardiac stressors, the t-tests were not found to be significant after the Bonferroni correction was applied. At *Time 1*, no significant differences were observed between patients with cardiac and non-cardiac focal stressors on their use of coping strategies at the tertiary (global) level, nor at the secondary level. However, at the primary (micro) level, differences approached significance. Patients who identified a cardiac focal stressor utilized more social withdrawal coping (a form of emotion disengagement), whereas patients who identified a non-cardiac focal stressor used more expression of emotions (a form of emotion engagement). Folkman et al. (1986) found that individuals coping with threats to physical health utilized more escape-avoidance strategies, which is consistent with the findings of this present study. At *Time 2*, patients with cardiac stressors utilized more engagement strategies than disengagement strategies. No significant differences were found at the secondary or primary levels of coping. In examining the engagement strategies at the primary level, however, patients with cardiac stressors tended to utilize more problem-solving and cognitive restructuring than expressing emotions and social support strategies. At *Time 3*, no differences were found at the tertiary or secondary level of coping and at the primary level differences were not significant after the Bonferroni correction was applied. Patients who identified a cardiac focal stressor utilized more social support (a form of emotion engagement coping) than did patients

who identified a non-cardiac stressor. This is consistent with the findings of Vitaliano et al. (1990) and Folkman et al. (1986) that individuals coped with physical illness or threats to health by seeking social support. Conclusive remarks about these trends cannot be made because they were not statistically significant. The large number of intragroup comparisons (22 cells) and the small sample in each of the categories precluded examination of the specific categories of illness, family and work stressors to determine whether differences existed at that level.

6.2.5 Research question 5: Prediction of possible mediator variables

Post-hoc analyses were conducted to examine whether program participation, defined as the total number of sessions attended, could incrementally predict changes in the mediator variables of personal mastery, kilocalorie expenditure, number of hassles, and coping strategies (all of which had emerged as predictive of psychological distress or social maladjustment), after controlling for several independent variables at intake. It must be noted that the number of sessions is a crude measure of program participation. Consequently, these results must be interpreted cautiously.

Program participation, was incrementally predictive of fewer number of hassles at *Time 3*. However, when the total number of exercise class sessions attended was used to operationalize program participation, it predicted higher levels of kilocalorie expenditure at the end of the program. That is, patients who participated in more exercise sessions during their rehabilitation program had a higher level of cardiac functional capacity. The rehabilitation program in which the patients were participants emphasizes physical

reconditioning, and the majority of patients received this treatment. Other services, such as stress management, occupational therapy, nutrition counselling, and vocational counselling, or individual and family counselling are offered to a smaller proportion of patients. Therefore, it is not surprising that program participation did not predict such variables as personal mastery and coping strategies, given that the program does not focus primarily on these factors.

As discussed previously, other variables in the regression analyses were significant predictors of these mediator variables. Personal mastery at *Time 3* was not predicted by program participation; however, controlling for personal mastery at *Time 1*, patients who, at intake, had higher kilocalorie expenditure, fewer hassles, lower reliance on disengagement coping, and lower psychological distress were found to have higher personal mastery at *Time 3*. This is consistent with research indicating that individuals with more self-confidence utilize less avoidance coping and rely on more active coping (Holahan & Moos, 1987). Fleishman (1984) found that individuals with low personal mastery used more selective ignoring, passive acceptance, and resignation coping strategies. Similarly, Waltz (1986) found that physical impairment and depressed mood predicted lower scores on personal mastery in MI patients.

Kilocalorie expenditure at *Time 3*, controlling for kilocalorie expenditure at *Time 1*, was predicted by higher personal mastery, fewer hassles, lower psychological distress, and fewer changes in the domain of home management (all at *Time 1*), as well as by number of physiotherapy sessions. As previously mentioned, kilocalorie expenditure did not predict lower psychological distress (see hypothesis 1); thus, the relationship appears

to be unidirectional. These data provide empirical support for the contention that psychosocial variables moderate the relationship between physical status and recovery level (Croog et al., 1968; Krantz & Deckel, 1983; Rejeski et al., 1985).

Number of hassles at Time 3, controlling for number of hassles at *Time 1*, was predicted by lower personal mastery, higher psychological distress at intake, and less program participation by the end of the program. A greater number of hassles was found to predict psychological distress in hypothesis 1, suggesting a bidirectional relationship. Regarding personal mastery, patients who do not feel in control may believe they are unable to influence undesirable events, which could result in feelings of helplessness, discouragement and non-adherence. Less program participation may result in poorer levels of recovery and less stress resilience generally.

Engagement and symptom management coping at *Time 3* was predicted by the use of these same strategies at intake, as well as by having a greater number of hassles at intake. Fleishman (1984) found that the greater the level of stress, the greater the frequency of coping behaviours. Education was not found to be significant, which differed from Pearlin and Schooler's (1978) and Billings and Moos's (1981) findings that "active" coping was more prevalent among those with more education. Reliance on disengagement coping was predicted by its use at intake and also by level of psychological distress, although the psychosocial block (i.e., psychological distress, and SIP subscales of home management and social interaction) was not significant. However,

this latter finding was due to the lack of association of the SIP variables of home management and social interaction with coping. The beta for psychological distress was found to be significant, indicating that patients with higher levels of distress are more likely to use disengagement coping than engagement coping. This pattern of findings suggests that, in the face of stress, distressed patients cope by withdrawing or avoiding the situation. This is consistent with Aldwin and Revenson's (1987) findings that individuals in poorer mental health used maladaptive coping strategies such as escapism. Holahan and Moos (1987) and Folkman and Lazarus (1986) also found that depressed patients were more likely than non-depressed patients to use avoidance-type coping. Disengagement coping was also found to predict psychological distress, again suggesting the possibility of a bidirectional relationship.

6.3 Strengths, Limitations, Research and Clinical Implications of the Study

6.3.1 Strengths

In addressing the limitations of previous studies in the areas of cardiac rehabilitation and stress and coping, this study employed a prospective design which was theoretically based to examine predictors of adjustment, defined coping based on Lazarus and Folkman's (1984) stress and coping model, utilized standardized measures of stress and coping that were consistent with the Tobin et al. (1989) model, identified the frequency and severity of stressors faced by cardiac patients and the strategies they used to cope, and assessed multidimensional outcomes at 3 time points during cardiac

rehabilitation. The longitudinal design used provides stronger evidence of causal relations among variables than the more frequently encountered cross-sectional design. Other strengths of this study include the identification of variables that mediate outcomes in addition to examining outcomes. The use of a clinical population yielded findings that are directly relevant to program development and evaluation in cardiac rehabilitation. Addressing the question of whether program participation predicts outcome, this study has provided some data of a program evaluative nature vis-à-vis specific effects on patients' adjustment. The instruments used to measure the independent and dependent variables in this study were unconfounded, and a thorough evaluation of the statistical assumptions pertaining to multicollinearity, outliers and influential data points for hierarchical multiple regression analysis was conducted.

6.3.2 Limitations

The data used in this study were based solely on self-report measures. Verification of key outcomes by such methods as direct observation of behaviour, use of key informants (Folkman et al., 1986) or use of semi-structured interviews may have strengthened the internal validity of the study (Coyne & Downey, in press). For example, the results of the intraclass correlations between the patients' and spouses' SIP scores (see Appendix F) indicated a relatively low intraclass correlation for the domain of social interaction (i.e., relatively low agreement between husband and wife). Data from significant others about patients' recovery level may provide important information not available from the patient's perspective. Spouses may be able to observe

manifestations of emotional distress in patients and changes in their interaction with family members and friends that patients may be either unable to perceive or unwilling to report. Significant others may also provide important information on the processes of stress and coping (Billings & Moos, 1981). Coyne and Downey (in press) suggest that coping studies need to examine how individuals manage their close relationships and that relationship-focused coping needs to be assessed. They also recommend that information regarding patients' past vulnerability to stressors and past history of psychopathology would provide links with patients' present resources and abilities to cope with adversity. Coping checklists may not be sufficient to reveal all dimensions of coping and may not reflect the specific competencies of individuals.

The subjects in this study were male cardiac patients between the ages of 27 to 66, in a comprehensive rehabilitation program. The results cannot be generalized to female patients, cardiac patients not in treatment, or other patient populations. Cardiac patients who seek, or who are referred to, rehabilitation programs may be different than patients who do not receive such services in terms of psychological distress, coping strategies employed, level of stress, or motivation for change. Future studies comparing patients who attend rehabilitation programs and those who do not, as well as research on female patients, would help to fill this gap in knowledge.

6.3.3 Research Implications

The findings of this study hold several implications for future research. That engagement coping was not found to predict better psychological adjustment may be due to the outcome measure used. The BSI is a self-report measure of psychopathology, and it is conceivable that engagement coping strategies serve to promote and maintain positive affect rather than reduce psychological distress. An instrument that measures "positive" mental health or well-being would enable more detailed study of the relationship between engagement coping and mental health. For example, Felton et al. (1984) found that cognitive restructuring and information-seeking, both engagement-type strategies, were positively correlated with positive affect. Similarly, information-seeking was related to increases in positive affect as well as decreases in negative affect among arthritic patients (Revenson & Felton, 1984).

In some of the regressions, the use of engagement and symptom management coping strategies was found to increase dysfunction. One factor not examined in this study, but which may help to explain this, is the efficacy of the coping effort in resolving the stressful situations. Aldwin and Revenson (1987) have termed this "coping efficacy". In this study, "coping effectiveness" was examined (i.e., the use of coping strategies were examined in relation to several specific outcome measures). However, this does not take into account whether the individual perceives the strategies as useful in that situation. For example, when instrumental action is used and the coping effort is perceived as successful, emotional distress may be decreased. However, when the coping strategy of instrumental action is not perceived as successful, symptoms of distress may increase

(Aldwin & Revenson, 1987). Hence, one reason that engagement coping did not predict fewer symptoms may be that those strategies were not perceived as successful in the stressful situation identified. Future research would benefit by examining not only the coping strategies used but also whether these strategies were perceived by the patient as successfully ameliorating the stressor.

The Symptom Management Scale (SMS) is a new instrument and it was chosen for this study because its items reflected some lifestyle strategies emphasized by multidisciplinary cardiac rehabilitation programs (e.g., use of relaxation, physical exercise, etc.). Although the SMS did not predict psychological distress or dysfunction scores on the SIP in the regression analyses, the bivariate correlations indicated a positive relationship between more symptom management and worse outcomes. The SMS correlates moderately with both disengagement and engagement coping (see Tables H-1, H-2, H-3 in Appendix H) suggesting that it may include both approach and escape strategies.

As previously mentioned, low endorsement rates on the SIP subscales were observed across the three time points. Once initial level of adjustment was removed from the regression equations, there may have been relatively little variance remaining to predict. Given the apparent insensitivity of this measure in assessing change, the relationship between stress, coping, and social maladjustment may not have been very powerfully evaluated in this study. Support for this latter interpretation comes from recent studies in which the SIP, when used with head injured patients, was found to differentiate well between head injured and non-head injured individuals, but it did not

differentiate levels of functioning within the patient group (Temkin, Dikmen, Machamer, McLean, 1989; Temkin, McLean, Dikmen, Gale, Bergner, & Almes, 1988).

The data generated by this study provide a framework for developing and targeting coping interventions involving stress reduction, mastery enhancement, and identifying and refining coping skills. Subsequent research addressing the extent to which such intervention influence the relevant mediators and the relationships between the mediators and outcomes, would provide sophisticated insight into their interactive causal relationships.

6.3.4 Clinical implications

Even though this was not a treatment study, several of the findings are suggestive for interventions with cardiac rehabilitation patients. Reliance on disengagement coping was consistently found to predict psychological distress and dysfunction in social interaction, even though the frequency of its use was lower than that of engagement coping. Efforts to prevent or reduce psychological distress and difficulties in social interaction among cardiac patients might be fruitfully directed at reducing the use of disengagement coping strategies. The data do not, however, support the notion that engagement coping should replace disengagement coping strategies: as was mentioned previously, engagement coping tended to have no significant relationships (in the regression analyses) with the outcomes studied.

Treatment strategies aimed at increasing an individual's competence in deflecting or mastering stressful events, or in tolerating some discomfort when stressors are

uncontrollable, may help decrease the use of disengagement and symptom-management coping. Helping patients either strengthen or regain a sense of personal mastery may also be beneficial in alleviating psychological distress and dysfunction in social interaction and work functioning. The data also suggest that preventive interventions should be aimed at helping patients reduce the number of hassles they experience. Endorsement of hassles is based on patients' cognitive appraisals of their experience. Patients may appraise threat when there is none and consequently experience emotional arousal and engage in unnecessary (or even apparently harmful) coping activity. Helping patients to reassess the nature of their hassles and examine the potential to change appraisals may help reduce their distress.

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APPENDICES

APPENDIX A-1

CARDIAC REHABILITATION STUDYInformation and Informed Consent

This research project is designed to study the ways in which people cope with the stress of heart attack and surgery. If you agree to participate in this study, you will be asked to fill out research questionnaires at the time that you begin treatment at the Heart Institute Prevention and Rehabilitation Centre, at 2.5 months and 5 months later. The questionnaires ask information regarding symptoms you may be having, changes in your level of activity, level of stress, and how you are coping with these changes. These questionnaires will be mailed to you and will require about 1 to 1.5 hours to complete. At the 5 month time point we would also like your spouse to fill out a questionnaire on your activity level.

You are under no obligation to participate. Your involvement in this research is voluntary. You have the right to withdraw from the study at any point in time without jeopardizing your current or any future treatment at the Heart Institute.

In research on coping with heart disease to date, there has been no evidence that people who participate by completing research questionnaires suffer any physical or psychological risks. And by participating in the study you will be helping us develop a better understanding of the experiences of cardiac patients and their needs. This will help in developing effective rehabilitation programmes.

Confidentiality

All information you give to this research project will be kept in confidence and in accordance with the guidelines of the Ontario Board of Examiners in Psychology. Your name will only be known to those who are involved in your care at the clinic. A research assistant will be involved in collecting some of the questionnaire information and she will ensure the confidentiality of all information. All data from this study will be pooled so that individuals cannot be identified. You will not in any way be identified in any published articles.

This study will be directed by Andrée Cazabon (doctoral candidate, University of Ottawa) The study will be supervised by Dr. R.J. Flynn, a registered psychologist and associate professor of Medicine and Psychology at the University of Ottawa and Dr. M. Rose, a staff psychologist at the Heart Institute Prevention and Rehabilitation Centre and assistant professor of Medicine and Psychology at the University of Ottawa.

I, _____, understand that I am being asked to participate in a study to examine the process of coping with my heart condition. I give permission for the collection of data for the study. I understand that all information gathered about my adjustment to my cardiac condition will be held in strict confidence within the limits of the law and accordance to the ethical principles of the Ontario Board of Examiners in Psychology, and that this information will be available only to those who are directly involved in this study. My participation in this research is voluntary and I may withdraw from this study at any time without penalty and without affecting my treatment at the University of Ottawa Heart Institute.

I can contact Andrée Cazabon or Dr. Malcolm Rose at the Heart Institute Prevention and Rehabilitation Centre (725-4754) or Dr. Robert Flynn at Psychological Services, University of Ottawa (564-6875) to answer any future questions or concerns that I may have.

I have received a copy of this consent form and I have read and understood it and my questions have been answered satisfactorily. I hereby agree to participate in the testing and in this study.

Signature of Participant

Witness' Signature

Investigator's Signature

APPENDIX A-2

CARDIAC REHABILITATION STUDY

Dear Mrs.

As you may know, your husband has been involved in a research project at the Heart Institute Prevention and Rehabilitation Centre. The purpose of this study is to understand the changes your husband has had to make since his heart attack or heart surgery, and how he has coped with the many different stresses.

As part of this research project we would like you to fill out a questionnaire regarding your husband's activity level. The questionnaire takes approximately 10 to 15 minutes and you would only need to complete it this one time.

The information you give will be kept in confidence. All data from this study will be pooled so that individuals cannot be identified. Your involvement in this research is voluntary and you are under no obligation to participate. By participating however, you will be providing us with important information regarding your husband's present activity level.

As part of the Civic Hospital's ethical guidelines, I need your consent in participating in this study. If you agree to participate, please read the statement, sign your name below, and then send this letter with the completed questionnaire in the stamped envelope provided.

=====

I, _____ (please print your name), understand that I am being asked to participate in this study to provide information on my husband's present activity level. I give my permission for the collection of data for the study. I understand that all information provided will be kept in strict confidence within the limits of the law and in accordance to the ethical principles of the Ontario Board of Examiners in Psychology, and that this information will be available only to those who are directly involved in this study. My participation in this research is voluntary.

I can contact Andrée Cazabon or Dr. Malcolm Rose at the Heart Institute Prevention and Rehabilitation Centre (725-4754) to answer any future questions or concerns that I may have.

I hereby agree to participate in this study.

Signature

Investigator's Signature

=====

THANK YOU FOR YOUR PARTICIPATION

APPENDIX B-1

CARDIAC REHABILITATION STUDY

I.D. NO. _____

PERSONAL INFORMATION SHEET

All the information you provide us with is confidential and will be used for research purposes only. PLEASE FILL OUT THIS FORM AS COMPLETELY AS POSSIBLE.

Name: _____ Date: _____

Home address: _____

Postal Code _____

Phone during the day: _____ During the evening: _____

1. My date of birth is: day _____ month _____ year _____. My age is _____ years.

2. Please check all of the following cardiac conditions which you have ever had and indicate when each one occurred.

[] a) I've never had a cardiac event

[] b) I had angina (chest pain) When? _____
month _____ year _____[] c) I had angioplasty When? _____
month _____ year _____[] d) I had a heart attack When? _____
month _____ year _____[] e) I had cardiac surgery (valve, bypass, transplant, etc) When? _____
month _____ year _____

3. Besides your heart condition, do you have any other medical problems that affect you presently? (eg. diabetes, arthritis)

Yes _____ No _____

If yes, please list:

1. _____
2. _____
3. _____

4. My present marital status is:

- [] a) Single (never married)
- [] b) Married & living with spouse
- [] c) Common-law
- [] d) Separated
- [] e) Divorced
- [] f) Widowed

5. The highest level of education I have completed is:
☐ a) Grade School
☐ b) High School
☐ c) Trade School
☐ d) Community College
☐ e) University (undergraduate)
☐ f) University (graduate)
6. Right now I am:
☐ a) Employed full-time
☐ b) Employed part-time
☐ c) Unemployed, but looking for work
☐ d) Unemployed, but not looking for work
☐ e) Full-time homemaker
☐ f) Retired
☐ g) On disability or sick leave
☐ h) Volunteering
7. My job is, or was (please specify) _____

8. IF YOU ARE RETIRED, was your retirement related to your heart condition?
 Yes _____ No _____ Not retired _____
9. IF YOU ARE NOT RETIRED, BUT ARE NOT WORKING, is this related to your heart condition?
 Yes _____ No _____ Not applicable _____
10. Have you ever had to change jobs because of your heart condition?
 Yes _____ No _____
11. On a 10-point scale, where 1 = poor and 10 = excellent, how would YOU personally rate the present condition of your heart? (please circle the appropriate number)
- | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| poor | | | | | | | | | excellent |
12. On the same 10-point scale, how would YOU personally rate your present overall state of physical health?
- | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| poor | | | | | | | | | excellent |
13. What do you hope to accomplish by coming to the Heart Institute Prevention and Rehabilitation Centre?

14. What kinds of changes would you like to make in the next few months?

All the information you provide us with is confidential and will be used for research purposes only. PLEASE FILL OUT THIS FORM AS COMPLETELY AS POSSIBLE.

1. Please check all of the following cardiac conditions which you have had during the last 2.5 months and indicate when each one occurred.

2. Have you had any other medical problems during the last 2.5 months?
(eg., diabetes, arthritis)

If yes, please list:

3. My present marital status is:

4. Right now I am:

- High School:
- [] a) Employed full-time
 - [] b) Employed part-time
 - [] c) Unemployed, but looking for work
 - [] d) Unemployed, but not looking for work
 - [] e) Full-time homemaker
 - [] f) Retired
 - [] g) On disability or sick leave
 - [] h) Volunteering

5. IF YOU ARE RETIRED, was your retirement related to your heart condition?
Yes_____ No_____ Not retired_____
6. IF YOU ARE NOT RETIRED, BUT ARE NOT WORKING, is this related to your heart condition?
Yes_____ No_____ Not applicable_____
7. Have you ever had to change jobs because of your heart condition?
Yes_____ No_____

8. Please put a check mark in the boxes below for each of the services in cardiac rehabilitation you have used in the last 3 months or are presently using.

Educational Sessions:

- ☐ a) Take Charge of Your Health
☐ b) Food, Activity and You

Nursing:

- ☐ a) Contact person appointments
☐ b) Education session with a nurse
☐ c) Smoking Cessation

Physiotherapy:

- ☐ a) Exercise Classes (track)
☐ b) Individual Sessions (home program, exercise test results, and other)

Vocational:

- ☐ a) Individual sessions concerning employment issues.

Occupational Therapy:

- ☐ a) Energy Conservation
☐ b) Leisure Counselling

Nutrition:

- ☐ a) Nutrition and Dietary Counselling
☐ b) Seen by Dr. Ooi (Lipid Management)

Psychology:

- ☐ a) Stress Management (group)
☐ b) Individual Sessions

Social Work:

- ☐ a) Individual Sessions
☐ b) Marital or Family Counselling

Medical:

- ☐ a) Physical Examination
☐ b) Follow-up Medical Appointments

APPENDIX B-3

CARDIAC REHABILITATION STUDY

I.D. NO. _____

PERSONAL INFORMATION SHEET - 6 MONTHS

All the information you provide us with is confidential and will be used for research purposes only. PLEASE FILL OUT THIS FORM AS COMPLETELY AS POSSIBLE.

Name: _____ Date: _____

1. Please check all of the following cardiac conditions which you have had during the last 2.5 months and indicate when each one occurred.

[] a) I did not have a cardiac event

[] b) I had angina (chest pain) When? _____
month year

[] c) I had angioplasty When? _____
month year

[] d) I had a heart attack When? _____
month year

[] e) I had cardiac surgery (valve, bypass, transplant, etc) When? _____
month year

[] f) other _____ When? _____
please describe month year

2. Have you had any other medical problems during the last 2.5 months?
(eg., diabetes, arthritis)

Yes _____ No _____

If yes, please list:

1. _____
2. _____
3. _____

3. My present marital status is:

[] a) Single (never married)
[] b) Married & living with spouse
[] c) Common-law
[] d) Separated
[] e) Divorced
[] f) Widowed

4. Right now I am:

[] a) Employed full-time
[] b) Employed part-time
[] c) Unemployed, but looking for work
[] d) Unemployed, but not looking for work
[] e) Full-time homemaker
[] f) Retired
[] g) On disability or sick leave
[] h) Volunteering

5. IF YOU ARE RETIRED, was your retirement related to your heart condition?
Yes _____ No _____ Not retired _____
6. IF YOU ARE NOT RETIRED, BUT ARE NOT WORKING, is this related to your heart condition?
Yes _____ No _____ Not applicable _____
7. Have you ever had to change jobs because of your heart condition?
Yes _____ No _____

8. Please put a check mark in the boxes below for each of the services in cardiac rehabilitation you have used in the last 3 months or are presently using.

Educational Sessions:

- [] a) Take Charge of Your Health
[] b) Food, Activity and You

Nursing:

- [] a) Contact person appointments
[] b) Education session with a nurse
[] c) Smoking Cessation

Physiotherapy:

- [] a) Exercise Classes (track)
[] b) Individual Sessions (home program, exercise test results, and other)

Vocational:

- [] a) Individual sessions concerning employment issues.

Occupational Therapy:

- [] a) Energy Conservation
[] b) Leisure Counselling

Nutrition:

- [] a) Nutrition and Dietary Counselling
[] b) Seen by Dr. Ooi (Lipid Management)

Psychology:

- [] a) Stress Management (group)
[] b) Individual Sessions

Social Work:

- [] a) Individual Sessions
[] b) Marital or Family Counselling

Medical:

- [] a) Physical Examination
[] b) Follow-up Medical Appointments

9. Have you had any appointments with any health professionals OUTSIDE the Heart Institute Prevention and Rehabilitation Centre in the past 3 months?

a) family doctor yes _____ no _____

b) cardiologist yes no

c) psychologist yes no

d) psychiatrist yes no

e) social worker yes_____ no_____

10. On a 10-point scale, where 1 = poor and 10 = excellent, how would YOU personally rate the present condition of your heart? (please circle the appropriate number)

1 2 3 4 5 6 7 8 9 10
poor excellent

11. On the same 10-point scale, how would YOU personally rate your present overall state of physical health?

1 2 3 4 5 6 7 8 9 10
poor excellent

12. What kinds of changes would you like to make in the next few months?

APPENDIX B-4

BELIEF QUESTIONNAIRE

ID# _____

For each of the following statements please circle the number that describes how strongly you agree or disagree with each statement.

	strongly agree	mildly agree	neither agree nor disagree	mildly disagree	strongly disagree
1. I have little control over the things that happen to me.	1	2	3	4	5
2. There is really no way I can solve some of the problems I have.	1	2	3	4	5
3. There is little I can do to change many of the important things in my life.	1	2	3	4	5
4. I often feel helpless in dealing with problems of life.	1	2	3	4	5
5. Sometimes I feel that I am being pushed around in life.	1	2	3	4	5
6. What happens to me in the future mostly depends on me.	1	2	3	4	5
7. I can do just about anything I really set my mind to.	1	2	3	4	5

APPENDIX B-5

ID# _____

HASSLES AND CONCERNS SCALE

The purpose of this questionnaire is to find out the kinds of hassles or concerns people with a heart condition experience.

These hassles or concerns are irritants that can range from minor annoyances to fairly major pressures, problems, or difficulties. They can occur few or many times and may last for short or long duration.

DIRECTIONS:

Listed below are a number of ways in which a person can feel hassled or concerned. First check yes or no for each of the hassles or concerns that have happened to you IN THE PAST MONTH. If you answered yes, then indicate by circling a 0, 1, 2, 3 or 4 how much you have been stressed by each of the statements. If you did not experience a hassle or concern in the last month then simply check no.

PLEASE DO NOT SKIP ANY ITEMS.

		If <u>yes</u> , how stressful?				
		not at all	a little bit	somewhat	moderately	extremely
1. Chest pain while doing day-to-day activities.	yes___ no___	0	1	2	3	4
2. Shortness of breath while doing day-to-day activities.	yes___ no___	0	1	2	3	4
3. Getting tired or aching legs.	yes___ no___	0	1	2	3	4
4. Feeling dizzy or light-headed.	yes___ no___	0	1	2	3	4
5. Feeling low in energy.	yes___ no___	0	1	2	3	4
6. Having palpitations (eg. fast or irregular heartbeats).	yes___ no___	0	1	2	3	4
7. Chest pain while walking at your own pace.	yes___ no___	0	1	2	3	4
8. Shortness of breath while walking at your own pace.	yes___ no___	0	1	2	3	4
9. Needing to rest frequently.	yes___ no___	0	1	2	3	4
10. Chest pain while exercising.	yes___ no___	0	1	2	3	4
11. Shortness of breath while exercising.	yes___ no___	0	1	2	3	4
12. Chest pain while having sexual intercourse.	yes___ no___	0	1	2	3	4
13. Shortness of breath while having sexual intercourse.	yes___ no___	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

		If <u>yes</u> , how stressful?				
		not at all	a little bit	somewhat	moderately	extremely
14. Concerns about your surgical scar.	yes___ no___	0	1	2	3	4
15. Loud valve sounds.	yes___ no___	0	1	2	3	4
16. Being aware of some foreign or artificial substance in your body.	yes___ no___	0	1	2	3	4
17. Having side effects to your medication.	yes___ no___	0	1	2	3	4
18. Misplacing or losing things.	yes___ no___	0	1	2	3	4
19. Social obligations.	yes___ no___	0	1	2	3	4
20. Inconsiderate smokers.	yes___ no___	0	1	2	3	4
21. Troubling thoughts about your future.	yes___ no___	0	1	2	3	4
22. Troubling thoughts about death.	yes___ no___	0	1	2	3	4
23. Health of a family member.	yes___ no___	0	1	2	3	4
24. Concerns about not having enough money for basic necessities (eg. clothing, food, entertainment, recreation, transportation).	yes___ no___	0	1	2	3	4
25. Not enough money for housing.	yes___ no___	0	1	2	3	4
26. Concerns about your financial security.	yes___ no___	0	1	2	3	4
27. Concerns about owing money.	yes___ no___	0	1	2	3	4
28. Concerns about getting credit.	yes___ no___	0	1	2	3	4
29. Concerns about money for emergencies	yes___ no___	0	1	2	3	4
30. Financial responsibility for someone who doesn't live with you.	yes___ no___	0	1	2	3	4
31. Smoking too much.	yes___ no___	0	1	2	3	4
32. Use of alcohol.	yes___ no___	0	1	2	3	4
33. Personal use of drugs (eg. tranquilizers).	yes___ no___	0	1	2	3	4
34. Too many responsibilities.	yes___ no___	0	1	2	3	4
35. Planning meals.	yes___ no___	0	1	2	3	4
36. Concerned about the meaning of life.	yes___ no___	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

		If <u>yes</u> , how stressful?				
		not at all	a little bit	somewhat	moderately	extremely
37. Trouble relaxing.	yes___ no___	0	1	2	3	4
38. Trouble making decisions.	yes___ no___	0	1	2	3	4
39. Problems getting along with fellow workers.	yes___ no___	0	1	2	3	4
40. Customers or clients give you a hard time.	yes___ no___	0	1	2	3	4
41. Concerns about job security.	yes___ no___	0	1	2	3	4
42. Concerns about retirement (eg. finding new interests, hobbies, and things to do).	yes___ no___	0	1	2	3	4
43. Laid-off or out of work.	yes___ no___	0	1	2	3	4
44. Don't like current job duties.	yes___ no___	0	1	2	3	4
45. Too much time on hands.	yes___ no___	0	1	2	3	4
46. Having to wait (eg. in line-ups, appointments etc).	yes___ no___	0	1	2	3	4
47. Concerns about potential future accidents.	yes___ no___	0	1	2	3	4
48. Being lonely.	yes___ no___	0	1	2	3	4
49. Fear of confronting someone or of being confronted by someone.	yes___ no___	0	1	2	3	4
50. Physical illness.	yes___ no___	0	1	2	3	4
51. Having to limit your activities.	yes___ no___	0	1	2	3	4
52. Concerns about medical treatment.	yes___ no___	0	1	2	3	4
53. Physical appearance.	yes___ no___	0	1	2	3	4
54. Fear of rejection.	yes___ no___	0	1	2	3	4
55. Sexual problems that result from physical problems.	yes___ no___	0	1	2	3	4
56. Sexual problems other than those resulting from physical problems.	yes___ no___	0	1	2	3	4
57. Concerns about health in general.	yes___ no___	0	1	2	3	4
58. Changing your diet.	yes___ no___	0	1	2	3	4
59. Wasting time.	yes___ no___	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

		If <u>yes</u> , how stressful?					
			<i>not at all</i>	<i>a little bit</i>	<i>somewhat</i>	<i>moderately</i>	<i>extremely</i>
			0	1	2	3	4
60. Concerns about not keeping up with general maintenance (eg. car, house, yard).	yes___ no___	0	1	2	3	4	
61. Filling out forms.	yes___ no___	0	1	2	3	4	
62. Financing children's education.	yes___ no___	0	1	2	3	4	
63. Problems with employees.	yes___ no___	0	1	2	3	4	
64. Reduced physical abilities.	yes___ no___	0	1	2	3	4	
65. Concerns about bodily functions.	yes___ no___	0	1	2	3	4	
66. Not getting enough rest.	yes___ no___	0	1	2	3	4	
67. Not getting enough sleep.	yes___ no___	0	1	2	3	4	
68. Problems with children.	yes___ no___	0	1	2	3	4	
69. Problems with your spouse or lover.	yes___ no___	0	1	2	3	4	
70. Overloaded with family responsibilities.	yes___ no___	0	1	2	3	4	
71. Too many things to do.	yes___ no___	0	1	2	3	4	
72. Unchallenging work.	yes___ no___	0	1	2	3	4	
73. Concerns about meeting high standards.	yes___ no___	0	1	2	3	4	
74. Job dissatisfactions.	yes___ no___	0	1	2	3	4	
75. Worries about decisions to change jobs.	yes___ no___	0	1	2	3	4	
76. Problems with divorce or separation.	yes___ no___	0	1	2	3	4	
77. Concerns about weight.	yes___ no___	0	1	2	3	4	
78. Not enough time to do the things you need to do.	yes___ no___	0	1	2	3	4	
79. Concerns about having to slow down and pace yourself more.	yes___ no___	0	1	2	3	4	
80. Concerns about personal difficulties.	yes___ no___	0	1	2	3	4	
81. Regrets over past decisions.	yes___ no___	0	1	2	3	4	
82. Nightmares.	yes___ no___	0	1	2	3	4	
83. Concerns about getting ahead.	yes___ no___	0	1	2	3	4	

(CONTINUED ON NEXT PAGE)

		If <u>yes</u> , how stressful?				
		not at all	a little bit	somewhat	moderately	extremely
84. Hassles from boss or supervisor.	yes___ no___	0	1	2	3	4
85. Difficulties with friends.	yes___ no___	0	1	2	3	4
86. Other people (spouse, friends, co-workers) not understanding that you have physical limitations due to your heart condition.	yes___ no___	0	1	2	3	4
87. Not enough time for family.	yes___ no___	0	1	2	3	4
88. Transportation problems.	yes___ no___	0	1	2	3	4
89. Shopping.	yes___ no___	0	1	2	3	4
90. Prejudice and discrimination from others.	yes___ no___	0	1	2	3	4
91. Not enough time for entertainment and recreation.	yes___ no___	0	1	2	3	4
92. Concerns about exerting yourself too much and possibly causing harm (eg. injuring a valve or vessel).	yes___ no___	0	1	2	3	4
93. Noise.	yes___ no___	0	1	2	3	4
94. Traffic.	yes___ no___	0	1	2	3	4
95. Concerns about recovering fully from your heart attack or surgery.	yes___ no___	0	1	2	3	4
96. Worrying about having to depend on your spouse too much (eg. emotionally or financially).	yes___ no___	0	1	2	3	4
Any other hassles or concerns that we might have missed?						
97. _____	yes___ no___	0	1	2	3	4
98. _____	yes___ no___	0	1	2	3	4
99. _____	yes___ no___	0	1	2	3	4
100. _____	yes___ no___	0	1	2	3	4

APPENDIX B-6

STRESS QUESTIONNAIRE

ID# _____

This next questionnaire has 4 parts. PART 1 asks that you describe a stressful situation you have encountered in the past week. You will be using this situation to answer PART 2, 3 and 4. The purpose of this questionnaire is to find out the kinds of situations that trouble people and how people deal with them.

IT IS VERY IMPORTANT THAT YOU DO NOT SKIP ANY PARTS OR ANY OF THE ITEMS.

PART 1 FOCAL STRESSOR

Take a few moments and think about a situation that has been most stressful for you during the last week. This event may or may not be related to your heart condition. By stressful we mean a situation that was difficult or troubling you, either because it upset you or because it took considerable effort to deal with it.

For example, it might have been a discussion or confrontation with someone close to you about your diet or smoking, or an argument with a family member, or a friend not understanding your physical limitations since your heart condition, or being in a situation where you had difficulty adjusting to your limitations since your heart condition.

Briefly describe the situation you encountered _____

PART 2 PRIMARY APPRAISALS

Please indicate why this situation (that you just described in Part 1) was stressful for you. Answer each item below by circling the appropriate number.

IN THIS SITUATION THERE WAS (IS) THE POSSIBILITY OF:

	does not apply	applies a little	applies somewhat	applies a lot	applies a great deal
1. Harm to your own health, safety or physical well-being.	0	1	2	3	4
2. Not achieving an important goal at your job or in your work.	0	1	2	3	4
3. A strain on your financial resources.	0	1	2	3	4
4. Losing the affection of someone important to you.	0	1	2	3	4
5. Losing your self-respect.	0	1	2	3	4
6. Appearing to be an uncaring person.	0	1	2	3	4
7. Losing the approval or respect of someone important to you.	0	1	2	3	4
8. Appearing incompetent.	0	1	2	3	4
9. Other: _____	0	1	2	3	4

If more than one statement in Part 2 applied, which one applies the most? (Please indicate by circling the appropriate number)

STATEMENT: 1 2 3 4 5 6 7 8 9

PART 3 SECONDARY APPRAISALS

Please circle the number on each item that best describes the situation.

TO WHAT EXTENT WAS THIS SITUATION ONE:

	not at all	a little	somewhat	quite a bit	very much so
1. That you could change or do something about.	0	1	2	3	4
2. That you had to accept.	0	1	2	3	4
3. In which you needed to know more before you could act.	0	1	2	3	4
4. In which you had to hold yourself back from doing what you wanted to do.	0	1	2	3	4

If more than one statement in Part 3 applied, please indicate which one best describes the problem by circling the appropriate number.

STATEMENT: 1 2 3 4

PART 4: COPING STRATEGIES INVENTORY

Take a few minutes to think about the situation that you just described in PART 1. As you read through the following items please answer them based on how you handled this stress.

PLEASE READ EACH ITEM AND DETERMINE THE EXTENT TO WHICH YOU USED IT IN HANDLING THIS SITUATION BY CIRCLING THE APPROPRIATE NUMBER.

Some of the items may seem repetitive, but it is important that you do not skip any items.

	not at all	a little	somewhat	much	very much
1. I just concentrated on what the next step would be.	0	1	2	3	4
2. I tried to get a new angle on the situation.	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

	not at all	a little	somewhat	much	very much
3. I found ways to blow off steam.	0	1	2	3	4
4. I accepted sympathy and understanding from someone.	0	1	2	3	4
5. I slept more than usual.	0	1	2	3	4
6. I hoped the problem would take care of itself.	0	1	2	3	4
7. I told myself that if I wasn't so careless, things like this wouldn't happen.	0	1	2	3	4
8. I tried to keep my feelings to myself.	0	1	2	3	4
9. I changed something so that things would turn out alright.	0	1	2	3	4
10. I looked for the silver lining, so to speak; tried to look on the bright side of things.	0	1	2	3	4
11. I did some things to get it out of my system.	0	1	2	3	4
12. I found somebody who was a good listener.	0	1	2	3	4
13. I went along as if nothing were happening.	0	1	2	3	4
14. I hoped a miracle would happen.	0	1	2	3	4
15. I realized that I brought the problem on myself.	0	1	2	3	4
16. I spent more time alone.	0	1	2	3	4
17. I stood my ground and fought for what I wanted.	0	1	2	3	4
18. I told myself things that helped me feel better.	0	1	2	3	4
19. I let my emotions go.	0	1	2	3	4
20. I talked to someone about how I was feeling.	0	1	2	3	4
21. I tried to forget the whole thing.	0	1	2	3	4
22. I wished that I never let myself get involved with that situation.	0	1	2	3	4
23. I blamed myself.	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

	not at all	a little	somewhat	much	very much
24. I avoided my family and friends.	0	1	2	3	4
25. I made a plan of action and followed it.	0	1	2	3	4
26. I looked at things in a different light and tried to make the best of what was available.	0	1	2	3	4
27. I let out my feelings to reduce the stress.	0	1	2	3	4
28. I just spent more time with people I liked.	0	1	2	3	4
29. I didn't let it get to me; I refused to think about it too much.	0	1	2	3	4
30. I wished that the situation would go away or somehow be over with.	0	1	2	3	4
31. I criticized myself for what happened.	0	1	2	3	4
32. I avoided being with people.	0	1	2	3	4
33. I tackled the problem head-on.	0	1	2	3	4
34. I asked myself what was really important, and discovered that things weren't so bad after all.	0	1	2	3	4
35. I let my feelings out somehow.	0	1	2	3	4
36. I talked to someone that I was very close to.	0	1	2	3	4
37. I decided that it was really someone else's problem and not mine.	0	1	2	3	4
38. I wished that the situation had never started	0	1	2	3	4
39. Since what happened was my fault, I really chewed myself out.	0	1	2	3	4
40. I didn't talk to other people about the problem.	0	1	2	3	4
41. I knew what had to be done, so I doubled my efforts and tried harder to make things work.	0	1	2	3	4
42. I convinced myself that things aren't quite as bad as they seem.	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

	not at all	a little	somewhat	much	very much
43. I let my emotions out.	0	1	2	3	4
44. I let my friends help out.	0	1	2	3	4
45. I avoided the person who was causing the trouble.	0	1	2	3	4
46. I had fantasies or wished about how things might turn out.	0	1	2	3	4
47. I realized that I was personally responsible for my difficulties and really lectured myself.	0	1	2	3	4
48. I spent some time by myself.	0	1	2	3	4
49. It was a tricky problem, so I had to work around the edges to make things come out OK.	0	1	2	3	4
50. I stepped back from the situation and put things into perspective.	0	1	2	3	4
51. My feelings were overwhelming and they just exploded.	0	1	2	3	4
52. I asked a friend or relative I respect for advice.	0	1	2	3	4
53. I made light of the situation and refused to get too serious about it.	0	1	2	3	4
54. I hoped that if I waited long enough, things would turn out OK.	0	1	2	3	4
55. I kicked myself for letting this happen.	0	1	2	3	4
56. I kept my thoughts and feelings to myself.	0	1	2	3	4
57. I worked on solving the problems in the situation.	0	1	2	3	4
58. I reorganized the way I looked at the situation, so things didn't look so bad.	0	1	2	3	4
59. I got in touch with my feelings and just let them go.	0	1	2	3	4
60. I spent some time with my friends.	0	1	2	3	4
61. Every time I thought about it I got upset; so I just stopped thinking about it.	0	1	2	3	4

(CONTINUED ON NEXT PAGE)

	not at all	a little	somewhat	much	very much
62. I wished I could have changed what happened.	0	1	2	3	4
63. It was my mistake and I needed to suffer the consequences.	0	1	2	3	4
64. I didn't let my family and friends know what was going on.	0	1	2	3	4
65. I struggled to resolve the problem.	0	1	2	3	4
66. I went over the problem again and again in my mind and finally saw things in a different light.	0	1	2	3	4
67. I was angry and really blew up.	0	1	2	3	4
68. I talked to someone who was in a similar situation.	0	1	2	3	4
69. I avoided thinking or doing anything about the situation.	0	1	2	3	4
70. I thought about fantastic or unreal things that made me feel better.	0	1	2	3	4
71. I told myself how stupid I was.	0	1	2	3	4
72. I did not let others know how I was feeling.	0	1	2	3	4

APPENDIX B-7

ID# _____

SYMPTOM MANAGEMENT SCALE

Listed below are different things people might do when they feel tense or stressed. How often you do the following kinds of things WHEN YOU FEEL TENSE OR STRESSED? (please circle the appropriate number)

	not at all	a little	somewhat	much	very much
1. Drink a moderate amount (i.e., 2 drinks of liquor, beer, or wine.	0	1	2	3	4
2. Drink more than a moderate amount of liquor, beer, or wine.	0	1	2	3	4
3. Take tranquilizers, sedatives, or other drugs.	0	1	2	3	4
4. Do physical exercise (jogging, exercycle, dancing, or other participative sports).	0	1	2	3	4
5. Use a relaxation exercise.	0	1	2	3	4
6. Eat or snack.	0	1	2	3	4
7. Watch TV.	0	1	2	3	4
8. Attend sporting, cultural and community events.	0	1	2	3	4
9. Take it out on family and friends.	0	1	2	3	4
10. Pursue hobbies or leisure time activities not mentioned above (eg. play piano).	0	1	2	3	4
11. Go buy something; spend money.	0	1	2	3	4
12. Do other types of activities that change how you feel physically not mentioned above (eg. hair done, massage, sauna, sexual activity).	0	1	2	3	4
13. Daydream.	0	1	2	3	4
14. Seek professional help or counselling.	0	1	2	3	4
15. Turn to prayer or spiritual thoughts.	0	1	2	3	4
16. Complain to others.	0	1	2	3	4
17. Smoke cigarettes, cigars, or pipe.	0	1	2	3	4

INSTRUCTIONS:

Below is a list of problems people sometimes have. Please read each one carefully, and circle the number to the right that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Circle only one number for each problem and do not skip any items. If you change your mind, erase your first mark carefully. Read the example below before beginning, and if you have any questions please ask about them.

SEX

MALE
☐FEMALE
☐

NAME:

LOCATION

EDUCATION:

MARITAL STATUS: MAR ___ SEP ___ DIV ___ WID ___ SING ___

DATE

MO	DAY	YEAR

ID.

NUMBER

AGE

VISIT NUMBER:

EXAMPLE

HOW MUCH WERE
YOU DISTRESSED BY:

	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
1. Bodyaches	0	1	2	3	4

HOW MUCH WERE YOU DISTRESSED BY:

HOW MUCH WERE YOU DISTRESSED BY:	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY	
1. Nervousness or shakiness inside	1	0	1	2	3	4
2. Faintness or dizziness	2	0	1	2	3	4
3. The idea that someone else can control your thoughts	3	0	1	2	3	4
4. Feeling others are to blame for most of your troubles	4	0	1	2	3	4
5. Trouble remembering things	5	0	1	2	3	4
6. Feeling easily annoyed or irritated	6	0	1	2	3	4
7. Pains in heart or chest	7	0	1	2	3	4
8. Feeling afraid in open spaces	8	0	1	2	3	4
9. Thoughts of ending your life	9	0	1	2	3	4
10. Feeling that most people cannot be trusted	10	0	1	2	3	4
11. Loss of appetite	11	0	1	2	3	4
12. Suddenly scared for no reason	12	0	1	2	3	4
13. Temper outbursts that you could not control	13	0	1	2	3	4
14. Feeling lonely even when you are with people	14	0	1	2	3	4
15. Feeling blocked in getting things done	15	0	1	2	3	4
16. Feeling lonely	16	0	1	2	3	4
17. Feeling blue	17	0	1	2	3	4
18. Feeling no interest in things	18	0	1	2	3	4
19. Feeling fearful	19	0	1	2	3	4
20. Your feelings being easily hurt	20	0	1	2	3	4
21. Feeling that people are unfriendly or dislike you	21	0	1	2	3	4
22. Feeling inferior to others	22	0	1	2	3	4
23. Nausea or upset stomach	23	0	1	2	3	4
24. Feeling that you are watched or talked about by others	24	0	1	2	3	4
25. Trouble falling asleep	25	0	1	2	3	4
26. Having to check and double check what you do	26	0	1	2	3	4
27. Difficulty making decisions	27	0	1	2	3	4
28. Feeling afraid to travel on buses, subways, or trains	28	0	1	2	3	4
29. Trouble getting your breath	29	0	1	2	3	4
30. Hot or cold spells	30	0	1	2	3	4
31. Having to avoid certain things, places, or activities because they frighten you	31	0	1	2	3	4
32. Your mind going blank	32	0	1	2	3	4
33. Numbness or tingling in parts of your body	33	0	1	2	3	4
34. The idea that you should be punished for your sins	34	0	1	2	3	4
35. Feeling hopeless about the future	35	0	1	2	3	4

APPENDIX B-9

SICKNESS IMPACT PROFILE

ID# _____

This questionnaire asks about the changes you have made in your activities due to your heart condition. We are interested in learning about any changes that describe you TODAY and are related to your state of health.

Put a check mark next to the true or false.

1. I do work around the house only for short periods of time or rest often. true___ false___
2. I am doing less of the regular daily work around the house than I would usually do. true___ false___
3. I am doing none of the regular daily work around the house that I would usually do. true___ false___
4. I am doing none of the maintenance or repair work that I would usually do in my home or yard. true___ false___
5. I am doing none of the shopping that I would usually do. true___ false___
6. I am doing none of the house cleaning that I would usually do. true___ false___
7. I have difficulty doing handwork, for example, turning faucets, using kitchen gadgets, sewing, carpentry. true___ false___
8. I am doing none of the clothes washing that I would usually do. true___ false___
9. I am doing none of the heavy work around the house. true___ false___
10. I have given up taking care of personal or household business affairs, for example, paying bills, banking, working on budget. true___ false___
11. I am going out less to visit people. true___ false___
12. I am not going out to visit people at all. true___ false___
13. I show less interest in other people's problems, for example, don't listen when they tell me about their problems, don't offer to help. true___ false___
14. I often act irritable toward those around me, for example, snap at people, give sharp answers, criticize easily. true___ false___
15. I show less affection. true___ false___
16. I am doing fewer social activities with groups of people. true___ false___
17. I am cutting down the length of visits with friends. true___ false___

(CONTINUED ON NEXT PAGE)

- | | |
|--|----------------|
| 18. I am avoiding social visits from others. | true__ false__ |
| 19. My sexual activity is decreased. | true__ false__ |
| 20. I often express concern over what might be happening to my health. | true__ false__ |
| 21. I talk <u>less</u> with those around me. | true__ false__ |
| 22. I make many demands, for example, insist that people do things for me, tell them how to do things. | true__ false__ |
| 23. I stay alone much of the time. | true__ false__ |
| 24. I act disagreeable to family members, for example, I act spiteful, I am stubborn. | true__ false__ |
| 25. I have frequent outbursts of anger at family members, for example, strike at them, scream, throw things at them. | true__ false__ |
| 26. I isolate myself as much as I can from the rest of the family. | true__ false__ |
| 27. I am paying <u>less</u> attention to the children. | true__ false__ |
| 28. I refuse contact with family members, for example, turn away from them. | true__ false__ |
| 29. I am doing <u>none</u> of the things I usually do to take care of my children or family. | true__ false__ |
| 30. I am <u>not</u> joking with family members as I usually do. | true__ false__ |
| 31. I do my hobbies and recreation for shorter periods of time. | true__ false__ |
| 32. I am going out for entertainment <u>less</u> often. | true__ false__ |
| 33. I am cutting down on <u>some</u> of my usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. | true__ false__ |
| 34. I am doing <u>none</u> of my usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. | true__ false__ |
| 35. I am doing more inactive pastimes in place of my other usual activities. | true__ false__ |
| 36. I am doing fewer community activities. | true__ false__ |
| 37. I am cutting down on <u>some</u> of my usually physical recreation or activities. | true__ false__ |
| 38. I am doing <u>none</u> of my usual physical recreation or activities. | true__ false__ |

(CONTINUED ON NEXT PAGE)

IF YOU ARE PRESENTLY WORKING PART-TIME OR FULL-TIME, PLEASE
ANSWER QUESTIONS 39 TO 46.

39. I am doing part of my job at home. true___ false___
40. I am not accomplishing as much as usual at work. true___ false___
41. I often act irritable toward my work associates,
for example, snap at them, give sharp answers,
criticize easily. true___ false___
42. I am working shorter hours. true___ false___
43. I am doing only light work. true___ false___
44. I work only for short periods of time or take
frequent rests. true___ false___
45. I am working at my usual job but with some changes,
for example, using different tools or special aids,
trading some tasks with other workers. true___ false___
46. I do not do my job as carefully and accurately as
usual. true___ false___

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRES

APPENDIX B-10

SICKNESS IMPACT PROFILE - SPOUSE VERSION

ID# _____

This questionnaire asks about the changes your spouse has made in his activities due to his heart condition. We are interested in learning about any changes that describe him TODAY and are related to his state of health.

Put a check mark next to the true or false.

1. He does work around the house only for short periods of time or rest often. true___ false___
2. He is doing less of the regular daily work around the house than he would usually do. true___ false___
3. He is doing none of the regular daily work around the house that he would usually do. true___ false___
4. He is doing none of the maintenance or repair work that he would usually do in your home or yard. true___ false___
5. He is doing none of the shopping that he would usually do. true___ false___
6. He is doing none of the house cleaning that he would usually do. true___ false___
7. He has difficulty doing handwork, for example, turning faucets, using kitchen gadgets, sewing, carpentry. true___ false___
8. He is doing none of the clothes washing that he would usually do. true___ false___
9. He is doing none of the heavy work around the house. true___ false___
10. He has given up taking care of personal or household business affairs, for example, paying bills, banking, working on budget. true___ false___
11. He is going out less to visit people. true___ false___
12. He is not going out to visit people at all. true___ false___
13. He shows less interest in other people's problems, for example, doesn't listen when they tell him about their problems, doesn't offer to help. true___ false___
14. He often acts irritable toward those around him, for example, snaps at people, gives sharp answers, criticizes easily. true___ false___
15. He shows less affection. true___ false___
16. He is doing fewer social activities with groups of people. true___ false___
17. He is cutting down the length of visits with friends. true___ false___

(CONTINUED ON NEXT PAGE)

18. He is avoiding social visits from others. true___ false___
19. His sexual activity is decreased. true___ false___
20. He often expresses concern over what might be happening to his health. true___ false___
21. He talks less with those around him. true___ false___
22. He make many demands, for example, insists that people do things for him, tells them how to do things. true___ false___
23. He stays alone much of the time. true___ false___
24. He acts disagreeable to family members, for example, he acts spiteful, he is stubborn. true___ false___
25. He has frequent outbursts of anger at family members, for example, strikes at them, screams, throws things at them. true___ false___
26. He isolates himself as much as he can from the rest of the family. true___ false___
27. He is paying less attention to the children. true___ false___
28. He refuses contact with family members, for example, turns away from them. true___ false___
29. He is doing none of the things he usually does to take care of our children or family. true___ false___
30. He is not joking with family members as he usually does. true___ false___
31. He does his hobbies and recreation for shorter periods of time. true___ false___
32. He is going out for entertainment less often. true___ false___
33. He is cutting down on some of his usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. true___ false___
34. He is doing none of his usual inactive recreation and pastimes, for example, watching TV, playing cards, reading. true___ false___
35. He is doing more inactive pastimes in place of his other usual activities. true___ false___
36. He is doing fewer community activities. true___ false___
37. He is cutting down on some of his usually physical recreation or activities. true___ false___
38. He is doing none of his usual physical recreation or activities. true___ false___

(CONTINUED ON NEXT PAGE)

IF YOUR SPOUSE IS PRESENTLY WORKING PART-TIME OR FULL-TIME, PLEASE
ANSWER QUESTIONS 39 TO 46.

39. He is doing part of his job at home. true___ false___ don't know___
40. He is not accomplishing as much as usual at work. true___ false___ don't know___
41. He often acts irritable toward his work associates,
for example, snaps at them, gives sharp answers,
criticizes easily. true___ false___ don't know___
42. He is working shorter hours. true___ false___ don't know___
43. He is doing only light work. true___ false___ don't know___
44. He works only for short periods of time or takes
frequent rests. true___ false___ don't know___
45. He is working at his usual job but with some changes,
for example, using different tools or special aids,
trading some tasks with other workers. true___ false___ don't know___
46. He is not doing his job as carefully and accurately as
usual. true___ false___ don't know___

(Please do not forget to enclose the consent letter in the envelope. Thank you)

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE

Appendix C

Table C-1

Response Rates^a for Questionnaires at the Three Times Points.

Questionnaire	Time 1		Time 2		Time 3	
	n	%	n	%	n	%
Demographic information	213	96	199	89	190	85
Personal mastery	213	96	199	89	190	85
Hassles and concerns scale	213	96	198	89	189	85
Coping strategies inventory ^b	195	87	179	80	161	72
Symptom management scale	213	96	199	89	188	84
Brief symptom inventory (BSI)	220 ^c	99	199	89	188	84
Sickness impact profile (SIP) subscales:						
a) Home management, recreation and pastimes, and social interaction	213	96	199	89	190	85
b) Work	89		112		107	
Sickness impact profile - Spouse version ^d (SIP-S) subscales:						
a) Home management, recreation and pastimes, and social interaction	--		--		164	92
b) Work	--		--		92	

^a Patients who met criteria and agreed to participate at intake $n = 223$.

^b Patients who claimed that they had not experienced specific stressor in the past week did not complete the CSI.

^c BSI (Time 1) was completed during HIPRC intake assessment. Three questionnaires were incomplete.

^d The SIP-S version was sent at Time 3 to spouses of patients who were married ($n = 179$).

Appendix D

Purging of Confounded Items

In research on the relationship between stress, coping and adaptational outcomes, concerns arise about confounding among variables, especially between the independent and dependent variables (Dohrenwend & Shrout, 1985; Lazarus et al., 1985). In order to minimize confounding among measures in the present study, items on different scales were compared and removed if they had similar (overlapping) content. This procedure was performed by the investigator and her primary supervisor. Items that corresponded to psychopathology and distress were removed in order not to replicate the construct measured on the BSI.

Given the central importance of the Coping Strategies Inventory (CSI) to this study, it was kept intact. When items from other measures were confounded with those from the CSI, the items from the other measures were removed. The Symptom Management Scale (SMS) was not confounded with any measure; however, it was modified because of its initially low internal consistency ($\alpha = .65$) (see Appendix - Internal Consistency of Scales). No items on the Personal Mastery scale were confounded with those on any of the questionnaires. Eleven items of the Hassles scale were confounded with the Brief Symptom Inventory (BSI) and Sickness Impact Profile (SIP) and were removed (85 items remained). The somatization subscale of the BSI was confounded with the Hassles and Concerns Scale due to its items pertaining to cardiac symptoms. Given that these symptoms can be experienced by cardiac patients and may

not be the result of anxiety expressed somatically (i.e., chest pain), the entire somatization subscale was removed (11 items) from the BSI. One item on the hostility scale was also removed because it was confounded with the CSI. A mean score was obtained on the remaining items, the BSI Global Severity Index (GSI) was recalculated and the appropriate T-score was employed in all analyses.

The 4 categories of the SIP were significantly modified due to confounding of items. The recreation and pastime subscale had 7 items confounded with CSI and SMS items, with only 1 item remaining; the subscale therefore was removed entirely. The social interaction scale was highly confounded with the social support subscale of the CSI, and 11 items were removed (9 items remained). The work subscale had only 1 item confounded with a CSI item (7 items remained), and the home management subscale did not need to be modified (original 10 items).

In summary, the Personal Mastery scale remained intact (7 items); the Hassles and Concerns Scale was reduced from 96 to 85 items; the CSI remained intact (72 items); the SMS was reduced from 17 to 14 items; the BSI was reduced from 53 to 41 items; the SIP-home management subscale was not changed (10 items); the SIP-recreation and pastime subscale was entirely removed; the SIP-social interaction subscale was reduced from 20 to 9 items; and the SIP-work subscale was reduced from 8 to 7 items.

Appendix E

Internal Consistency of Scales

The internal consistency of each scale was calculated using Cronbach's coefficient alpha or, for scales scored dichotomously, Kuder-Richardson formula 20 (K-R 20). Comparisons of the questionnaires before and after item purging are provided in Table E-1, and the internal consistency coefficients, at all three time points, of the final forms of the scales as used in the analyses are shown in Table E-2.

The internal consistency of the original Symptom Management Scale (17 items) was low ($\alpha = .65$). Item endorsement rates were examined to determine whether internal consistency could be improved after removing items with extreme rates of endorsement. Four items had low rates ($< 25\%$ of the sample); however, one of these items, "Seeking professional help", was considered to be an important item and was kept. Examination of individual items indicated significant positive skewness. To further improve internal consistency, all items were recoded (0, 1). The resulting internal consistency of the final 14-item SMS (K-R 20) was .69.

Given that SIP items within subscales were removed, the original scoring procedure -- which consisted of adding weights for each item -- was modified. These weights were removed and each item was scored (0, 1).

Appendix E

Table E-1

Internal Consistency (Cronbach's Coefficient Alpha^a or Kuder-Richardson 20^b) of Each Scale Before and After Item Purging.

Scales	No. of items originally	Internal consistency	No. of items after purging	Internal consistency
Personal mastery ^a	7	.73	N/A	--
Hassles and concerns scale ^b	96	.94	85	.93
Coping strategies inventory Total ^a	72	.93	N/A	--
Tertiary level:				
Engagement ^a	36	.92	N/A	--
Disengagement ^a	36	.91	N/A	--
Symptom management scale ^a	17	.65	14	.69 ^b
Brief symptom inventory ^a	53	.94	41	.90
Sickness impact profile subscales:				
Home-management ^b	10	.70	N/A	--
Social-interaction ^b	20	.85	9	.76
Work ^b	8	.74	7	.73

Note. N/A = not applicable (i.e., original scale was unchanged).

Appendix E

Table E-2

Internal Consistency (Cronbach's Coefficient Alpha^a or Kuder-Richardson 20^b) of Each Scale at the Three Time Points.

Scales	No. of items after purging	Time 1			Time 2			Time 3		
		n			n			n		
Personal mastery ^a	7	211	.73		199	.78		190	.79	
Hassles and concerns scale ^b	85	205	.93		186	.94		181	.94	
Coping strategies inventory										
Total ^a	72	186	.93		173	.93		153	.94	
Tertiary level:										
Engagement ^a	36	190	.92		177	.93		157	.94	
Disengagement ^a	36	191	.91		174	.90		157	.92	
Symptom management scale ^a	14	203	.69		194 ^b	.76		186	.74	
Brief symptom inventory ^a	41	220	.90		199	.92		188	.92	
Sickness impact profile										
subscale:										
Home-management ^b	10	213	.70		199	.75		190	.76	
Social-interaction ^b	9	213	.76		199	.73		190	.77	
Work ^b	7	89	.73		112	.75		107	.77	
Sickness impact profile -										
Spouse version subscales:										
Home-management ^b	10	---			---			162	.79	
Social-interaction ^b	9	---			---			162	.75	
Work ^b	7	---			---			91	.81	

Appendix F

**Intraclass Correlation Between Patients'
and Spouses' Sickness Impact Profile (SIP)**

As a validity measure, patients' spouses ($n = 164$) completed the SIP-S at *Time 3*. Intraclass correlation coefficients (ICC 1,1; Shrout & Fleiss, 1979) were calculated between the SIP and SIP-S subscales, were as follows: home management ICC (1,1) = .74; social interaction ICC (1,1) = .41; and work ICC (1,1) = .68. These results suggest that spouses' observations of patients' social maladjustment were in agreement with patients' self-report on the subscales of home management and work. The social interaction subscale coefficient is considerably lower; this lower rate of agreement may reflect the more subjective and inferential nature of the SIP social interaction scale. It also suggests greater caution in interpreting the SIP social interaction scores provided by the research sample.

Appendix G

Factor Structure of the Coping Strategies Inventory (CSI)

To examine whether the factor structure of the CSI (Tobin et al., 1989) could be duplicated with this sample, a principal components analysis with a varimax rotation, was performed on the CSI. Patients' subscale scores (primary level) at *Time 1* were entered. Determination of the number of factors to be extracted was based on the eigenvalue-one criterion, supplemented by the Scree Test (Cattell, 1966). As can be seen in Table G-1, the factors that emerged were identical to the hierarchical factor structure of Tobin et al. (1989). The two factors accounted for 57.5% of the variance, and all communality values were 0.50 or greater.

Appendix G

Table G-1

Principal Component Analysis of the Coping Strategies Inventory (CSI) (n=195).

Factor	Component measures	Factor loadings	
		1	2
Disengagement coping	Social-withdrawal	.81	.00
	Wishful-thinking	.80	.22
	Self-criticism	.72	.05
	Problem-avoid	.66	.26
Engagement coping	Social-support	-.03	.83
	Cognitive-restructuring	.24	.74
	Problem-solving	.11	.73
	Express-emotions	.16	.62

Appendix H

Intercorrelation Between the Coping Strategies Inventory (CSI) and Symptom Management Scales (SMS)

The intercorrelations among the CSI and the SMS scales are displayed in Tables H-1 to H-3. They generally indicate adequate convergent and discriminant validity. The SMS scale was not highly correlated with the CSI scales (r ranged from .05 to .28). The SMS items measure emotional-physical coping strategies rather than cognitive-behavioural coping. However, of note is that the engagement and disengagement scales are positively and significantly correlated with each other at each of the three time points ($r = .32$; $r = .27$; and $r = .30$, respectively). According to Tobin et al. (1989), these correlations should be approximately zero.

Appendix H

Table H-1

Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 1 ($n = 195$).

Scales	CSI														
	Primary level					Secondary level					Tertiary level				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coping strategies inventory (CSI)															
<i>Primary level:</i>															
1. Problem solving	---														
2. Cognitive restructuring	.59***	---													
3. Express emotions	.31***	.22***	---												
4. Social support	.37***	.49***	.46***	---											
5. Problem avoidance	.11	.32***	.24***	.24***	---										
6. Wishful thinking	.17*	.23***	.32***	.22**	.53***	---									
7. Self-criticism	.18**	.24***	.16*	-.01	.25***	.48***	---								
8. Social withdrawal	.18*	.24***	.07	-.02	.42***	.52***	.42***	---							
<i>Secondary level:</i>															
9. Problem engagement	.91***	.87***	.30***	.48***	.23***	.22**	.23***	.23***	---						
10. Emotion engagement	.39***	.40***	.88***	.83***	.28***	.32***	.09	.03	.45***	---					
11. Problem disengagement	.17*	.30***	.33***	.26***	.83***	.91***	.43***	.54***	.26***	.35***	---				
12. Emotion disengagement	.21**	.28***	.14*	-.02	.38***	.58***	.88***	.80***	.28***	.08	.57***	---			
<i>Tertiary level:</i>															
13. Engagement	.78***	.77***	.68***	.76***	.30***	.32***	.20**	.16*	.87***	.83***	.35***	.21**	---		
14. Disengagement	.22**	.33***	.26***	.13	.68***	.84***	.75***	.76***	.30***	.24***	.88***	.89***	.32***	---	
15. Symptom management scale (SMS)	.13	.26***	.21***	.24***	.20**	.23***	.05	.11	.21***	.26***	.25***	.09	.28***	.19***	---

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix H

Table H-2

Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 2 ($n = 179$).

Scales	CSI														
	Primary level					Secondary level					Tertiary level				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coping strategies inventory (CSI)															
<i>Primary level:</i>															
1. Problem solving	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2. Cognitive restructuring	.66***	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3. Express emotions	.48***	.46***	---	---	---	---	---	---	---	---	---	---	---	---	---
4. Social support	.43***	.49***	.60***	---	---	---	---	---	---	---	---	---	---	---	---
5. Problem avoidance	.07	.32***	.26***	.28***	---	---	---	---	---	---	---	---	---	---	---
6. Wishful thinking	.13	.26***	.30***	.23**	.44***	---	---	---	---	---	---	---	---	---	---
7. Self-criticism	.10	.02	.11	.05	.13	.41***	---	---	---	---	---	---	---	---	---
8. Social withdrawal	.12	.17*	.16*	.01	.29***	.52***	.37***	---	---	---	---	---	---	---	---
<i>Secondary level:</i>															
9. Problem engagement	.92***	.90***	.46***	.51***	.21**	.21**	.07	.16*	---	---	---	---	---	---	---
10. Emotion engagement	.45***	.53***	.90***	.89***	.30***	.29***	.09	.09	.54***	---	---	---	---	---	---
11. Problem disengagement	.13	.33***	.33***	.29***	.78***	.91***	.35***	.50***	.24***	.35***	---	---	---	---	---
12. Emotion disengagement	.14	.11	.16*	.04	.24***	.56***	.86***	.79***	.13	.11	.50***	---	---	---	---
<i>Tertiary level:</i>															
13. Engagement	.80***	.83***	.76***	.78***	.29***	.28***	.09	.14	.89***	.86***	.33***	.14	---	---	---
14. Disengagement	.15*	.25***	.28***	.19*	.59***	.85***	.70***	.74***	.22**	.26***	.87***	.86***	.27***	---	---
15. Symptom management scale (SMS)															
	.15	.35***	.39***	.36***	.24***	.40***	.17*	.34***	.26***	.42***	.39***	.30***	.39***	.40***	---

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix H

Table H-3

Zero-order Intercorrelations of Coping Strategies Inventory (CSI) and Symptom Management Scale (SMS) at Time 3 ($n = 161$).

Scales	CSI								CSI					SMS	
	Primary level				Secondary level				Tertiary level						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coping strategies inventory (CSI)															
<i>Primary level:</i>															
1. Problem solving	---														
2. Cognitive restructuring	.58***	---													
3. Express emotions	.40***	.37***	---												
4. Social support	.49***	.51***	.55***	---											
5. Problem avoidance	.02	.37***	.39***	.21**	---										
6. Wishful thinking	.06	.23***	.35***	.25**	.54***	---									
7. Self-criticism	.12	.20**	.20*	.04	.34***	.54***	---								
8. Social withdrawal	.09	.18*	.14	.16*	.53***	.51***	.39***	---							
<i>Secondary level:</i>															
9. Problem engagement	.90***	.87***	.43***	.56***	.21**	.16*	.18*	.15	---						
10. Emotion engagement	.50***	.49***	.90***	.86***	.35***	.34***	.14	.17*	.56***	---					
11. Problem disengagement	.05	.33***	.41***	.26***	.84***	.91***	.52***	.59***	.20**	.39***	---				
12. Emotion disengagement	.13	.23**	.21**	.11	.51***	.63***	.88***	.78***	.20**	.18*	.65***	---			
<i>Tertiary level:</i>															
13. Engagement	.80***	.78***	.74***	.80***	.31***	.28***	.18*	.18*	.89***	.87***	.33***	.22**	---		
14. Disengagement	.10	.31***	.34***	.20**	.73***	.84***	.77***	.75***	.22**	.31***	.91***	.91***	.30***	---	
15. Symptom management scale (SMS)															
	.22**	.39***	.27***	.36***	.21***	.28***	.21**	.24**	.34***	.36***	.28***	.27***	.39***	.30***	---

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix I

**Evaluation of Assumptions, Multicollinearity, Outliers,
and Influential Data Points for the Hierarchical Multiple Regression Models**

1. Evaluation of assumptions for the regression models:

Normality, linearity, and homoscedasticity

Objective 2: Prediction of outcomes - psychological distress and social maladjustment

Studentized residual plots were examined to assess potential violation of assumptions using SPSS^x REGRESSION (SPSS^x, 1988) in standard multiple regressions between each dependent variable (psychological distress as measured by the BSI, and the three subscales of the SIP, home management, social interaction, and work) and each set of independent variables (initial adjustment score, demographic variables, personal mastery, kilocalorie expenditure, number of hassles, and coping strategies). Two regression models were tested with each dependent variable: coping strategies entered at the time point prior to outcome measurement (*Model A*), and coping strategies entered at the same time point as the outcome variable (*Model B*). Separate regression analyses were conducted on each dependent variable at the three time points: *Time 1* to *Time 2*; *Time 2* to *Time 3*; and *Time 1* to *Time 3* (see Figure 9). In total, 24 standard multiple regressions, 6 for each dependent variable, were conducted to verify the assumptions.

In both *Model A* and *Model B*, no significant violations of the normality or linearity assumptions were observed in the studentized residuals of the dependent variable BSI at any of the 3 time points. However, there was a slight indication that some variables were skewed, which would potentially violate the homoscedasticity assumption. The distributions of the individual dependent and independent variables were examined for skewness using SPSS^x FREQUENCIES. Significant skewness ($z = \pm 3.67$, $p < .001$) was determined by the equation:

$$z = \frac{\text{skewness}}{\text{standard error of skewness}}$$

(Tabachnick & Fidell, 1989, p. 72).

The significantly skewed variables (dependent variable: BSI (*Time 3*); independent variables: kilocalorie expenditure (*Time 1* and *Time 2*), number of hassles (*Time 1* and *Time 2*) and disengagement coping strategies (*Time 1* and *Time 2*)) were transformed using variance-stabilizing transformations (square root for moderate skewness or logarithm for severe skewness). Standard multiple regressions were rerun with the transformed variables to examine the studentized residual plots and improvement in fit of the model. The transformation of the variables, however, did not significantly improve heteroscedasticity, nor did it improve the fit of the regression model (R^2 actually decreased between .006 to .01). Given these results, the final multiple hierarchical regressions analyses were performed with untransformed variables in order to maximize interpretability of results and comparability of the outcome variables at the 3 time points.

The studentized scatterplots for the three subscales of the SIP, home management, social interaction and work, were examined separately. The residuals met the linearity assumption; the normality and homoscedasticity assumption, however, were violated. SPSS* FREQUENCIES was used to examine the distributions of the dependent variables. The three dependent variables were significantly positively skewed at the 3 time points, and appropriate variance-stabilizing transformations (square root or logarithm) of the variables were applied. The transformation of the dependent and independent variables did not significantly improve heteroscedasticity, and normality was improved for only 5 of the 9 regression equations. For reasons of interpretability and comparability between the outcome variables at the three time points and with other outcome variables, the untransformed variables were utilized in the final multiple hierarchical regression analyses. Violation of the homoscedasticity assumption degrades the fit of the model and therefore weakens the analysis but does not invalidate it. The relatively high cases-to-independent-variables ratio (*Model A: Time 1 to Time 2, 17:1; Time 2 to Time 3, 16:1; Time 1 to Time 3, 16:1; Model B: Time 1 to Time 2, 16:1; Time 2 to Time 3, 14:1; Time 1 to Time 3, 15:1*) also supports the use of untransformed data when the dependent variable is skewed (Tabachnick & Fidell, 1989).

Objective 6: Effects of Program Participation

Studentized residual plots of the dependent variables -- personal mastery, kilocalorie expenditure, number of hassles and coping strategies (engagement,

disengagement, and symptom management, separately) – were also examined to assess potential violation of assumptions. In total, 6 standard multiple regressions were conducted.

No significant violations of the normality, linearity or homoscedasticity assumptions were observed in the studentized residuals of the dependent variables personal mastery, engagement coping and symptom management coping. For the dependent variable kilocalorie expenditure the linearity assumption was met; however, the normality and homoscedasticity assumption were violated. The residuals for the dependent variables number of hassles and disengagement coping met the normality and linearity assumptions; there was a slight indication, however, that some variables were skewed, which would potentially violate the homoscedasticity assumption. SPSS* FREQUENCIES was used to examine the distributions of the independent variables in the regressions which violated assumptions. In all cases, a few of the independent variables were positively skewed. However, for reasons of interpretability and comparability with other outcome variables, the variables were not transformed.

2. Multicollinearity

SPSS* REGRESSION has a built-in indicator of interdependence called tolerance, which protects against inclusion of multicollinear variables. If the tolerance of any variable is less than 0.01, the variable is not included in the analyses. In all equations,

multicollinearity did not pose a problem, as all variables had a tolerance value greater than 0.01.

3. Outliers and Influential Data Points

Outliers and Influential Points on the Dependent Variables

Objective 2: Prediction of outcomes of psychological distress and social maladjustment. Potential outliers on each dependent variable were examined using Weisberg's t statistic for testing an outlier for significance:

$$t_i = r'_i \sqrt{\left(\frac{n-p'-1}{n-p'-r_{i^2}} \right)}$$

(Weisberg, 1980, cited in Stevens, 1986, p. 87)

where r is the standardized residual, n is the sample size, and p is the number of parameters (including the regression constant). The level of significance is based on critical values calculated with Bonferroni inequality α/n , and the critical values are based on $\alpha = .05$.

In *Model A* at the three time points, 1 outlier on the BSI was identified with the Weisberg t statistic (*Time 2 to Time 3*, $t = 3.84$, $p < .05$). On the SIP, 4 outliers were

identified on the home management subscale (*Time 1 to Time 2*, $t = 3.78$; *Time 2 to Time 3*, $t = 4.95$; $t = 4.48$; *Time 1 to Time 3*, $t = 4.63$, $p < .05$); 1 outlier on the social interaction subscale (*Time 1 to Time 3*, $t = 3.87$, $p < .05$); and 2 outliers on the work subscale were identified (*Time 2 to Time 3*, $t = 3.89$; *Time 1 to Time 3*, $t = 3.62$, $p < .05$). In *Model B*, 3 outliers on the BSI were identified (*Time 1 to Time 2*, $t = 3.73$; *Time 2 to Time 3*, $t = 4.10$; *Time 1 to Time 3*, $t = 4.91$, $p < .05$); and on the SIP, 4 outliers on the home management subscale (*Time 1 to Time 2*, $t = 3.72$; *Time 2 to Time 3*, $t = 5.31$; $t = 4.13$; *Time 1 to Time 3*, $t = 4.32$, $p < .05$); no outliers on the social interaction subscale; and 1 outlier on the work subscale were found (*Time 2 to Time 3*, $t = 3.56$, $p < .05$). To determine whether any of these outliers were influential in affecting the regression equations, Cook's distance measure was examined. None of the outliers were significant on Cook's distance (< 1); therefore, there was no need to delete these data points since they were not influential points in the regression equation (Stevens, 1986). These cases were found to have a higher mean on the dependent variable in question.

Objective 6: Effects of program participation. Among the six regressions, only one outlier on the dependent variable of disengagement coping was identified with the Weisberg t statistic ($t = 3.85$, $p < .05$). However, the outlier was not significant on Cook's distance measure (< 1). Therefore, there was no need to delete the data point since it was not an influential point in the regression equation. This case was found to have a higher mean on the dependent variable.

Outliers and Influential Points on the Predictors.

Objective 2: Prediction of outcomes - psychological distress and social maladjustment.

Outliers were examined on the set of predictors within each regression analysis using Mahalanobis distances (D^2 , $p < .001$) and Cook's distance ($CD > 1$). In *Model A* at the three time points, 6 outliers on the BSI were identified using Mahalanobis distance (*Time 1 to Time 2*, $D^2 = 36.40$; *Time 2 to Time 3*, $D^2 = 38.40$; $D^2 = 37.03$; $D^2 = 35.21$; *Time 1 to Time 3*, $D^2 = 34.85$; $D^2 = 31.38$, $p < .001$); and on the SIP, 4 outliers on the home management subscale (*Time 1 to Time 2*, $D^2 = 36.79$; *Time 2 to Time 3*, $D^2 = 36.68$; $D^2 = 33.95$; *Time 1 to Time 3*, $D^2 = 35.32$; $p < .001$); and 4 outliers on the social interaction subscale were found (*Time 1 to Time 2*, $D^2 = 36.81$; *Time 2 to Time 3*, $D^2 = 39.48$; $D^2 = 35.36$; *Time 1 to Time 3*, $D^2 = 35.38$; $p < .001$). No outliers on the work subscale were identified. In *Model B*, 6 outliers on the BSI were identified using Mahalanobis distance (*Time 1 to Time 2*, $D^2 = 35.87$; *Time 2 to Time 3*, $D^2 = 42.01$; $D^2 = 34.16$; $D^2 = 31.50$; *Time 1 to Time 3*, $D^2 = 35.23$; $D^2 = 33.88$, $p < .001$); and on the SIP, 3 outliers on the home management subscale (*Time 1 to Time 2*, $D^2 = 36.41$; *Time 2 to Time 3*, $D^2 = 33.99$; *Time 1 to Time 3*, $D^2 = 36.13$; $p < .001$); and 4 outliers on the social interaction subscale were found (*Time 1 to Time 2*, $D^2 = 36.04$; *Time 2 to Time 3*, $D^2 = 36.05$; $D^2 = 32.22$; *Time 1 to Time 3*, $D^2 = 35.86$; $p < .001$). No outliers on the work subscale were identified. None of these outliers were significant on Cook's distance measure (< 1). Therefore, the cases were not removed from the analyses since they were not influential data points in the regression equations.

Objective 6: Effects of program participation. Outliers were examined on the set of predictors within each regression analysis using Mahalanobis distances (D^2 , $p < .001$) and Cook's distance ($CD > 1$). With the six regressions, the same outlier was found with the dependent variable, personal mastery ($D^2 = 37.26$), kilocalorie expenditure ($D^2 = 40.91$), number of hassles ($D^2 = 37.07$), engagement coping ($D^2 = 36.80$), disengagement coping ($D^2 = 36.75$), and symptom management coping ($D^2 = 37.23$). However, the outlier was not significant on Cook's distance measure (< 1) for any of the regression equations. Therefore the case was not removed from the analyses since it was not an influential data point in the regression equations.

Appendix J

Table J-1

Frequency of Respondents and Non-respondents to the Coping Strategies Inventory (CSI) for Regression Models A and B.

	<i>Time 1 predictors with Time 2 outcomes</i>	<i>Time 2 predictors with Time 3 outcomes</i>	<i>Time 1 predictors with Time 3 outcomes</i>
<u><i>Model A</i></u>			
Respondents	185	171	179
Non respondents	12	16	10
<u><i>Model B</i></u>			
Respondents	177	158	160
Non respondents	20	29	29

Table K-1

Block Variables	Model A (n = 185)				Model B (n = 177)			
	β^a	R	R ²	ΔR^2	β^a	R	R ²	ΔR^2
1 Time / psychological distress	.70***	.70***	.49	.49***	.70***	.70***	.49	.49***
2 <u>Demographic variables</u>								
Age	-.01				.00			
Education ^b	.06				.07			
Marital status ^b	-.02				-.05			
Employment status ^b	.00	.71***	.50	.00	.00	.71***	.50	.01
3 Personal mastery	-.18**	.72***	.53	.03**	-.18**	.72***	.53	.03**
4 Kilocalorie expenditure	-.03	.73***	.53	.00	-.03	.73***	.53	.00
5 Number of hassles	.32***	.76***	.58	.06***	.30***	.76***	.57	.05***
6 <u>Coping variables</u>								
Engagement	-.01				.02			
Disengagement	.22***				.25***			
Symptom management	.14***	.80***	.64	.05***	.18**	.81***	.66	.09***
Total equation								

Model A

R² = .64

F_(11, 173) = 28.48***

Mean of DV = 54.61

SD = 8.58

Model B

R² = .66

F_(11, 165) = 29.36***

Mean of DV = 54.86

SD = 8.53

0=not married; 1=married; 2=not employed; 3=employed

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix K

Table K-2

Hierarchical Multiple Regression of Psychological Distress (BSI score; Time 3) on Psychological Distress, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 171)					Model B (n = 158)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 2 psychological distress	.81***	.81***	.65	.65***	320.40***	.83***	.83***	.69	.69***	353.67***
2 <u>Demographic variables</u>										
Age	.06					.08				
Education ^b	-.13**					-.13**				
Marital status ^b	-.02					.00				
Employment status ^b	.01	.82***	.67	.02*	2.42*	.03	.85***	.72	.02*	2.90*
3 Personal mastery	-.17**	.83***	.69	.02**	10.53**	-.16**	.86***	.73	.02**	9.49**
4 Kilocalorie expenditure	-.05	.83***	.70	.00	1.02	-.05	.86***	.73	.00	1.39
5 Number of hassles	.31***	.86***	.74	.05***	28.96***	.27***	.88***	.77	.03***	20.55***
6 <u>Coping variables</u>										
Engagement	-.02					.04				
Disengagement	.03					.19***				
Symptom management	.03	.86***	.74	.00	.26	.05	.90***	.80	.04***	9.38***
<u>Total equation</u>			<u>Model A</u>					<u>Model B</u>		
			R ² = .74					R ² = .80		
			F _(11,159) = 41.75***					F _(11,146) = 54.68***		
			Mean of DV = 53.92					Mean of DV = 54.67		
			SD = 8.76					SD = 8.79		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Table L-1

Block Variables	Model A (<i>n</i> = 185)				Model B (<i>n</i> = 177)			
	β^a	R	R ²	ΔF	β^a	R	R ²	ΔF
1 Time / home management	.54***	.54***	.29	.29***	.52***	.52***	.27	.27***
2 Demographic variables								
Age	.14*				.13			
Education ^b	-.02				-.04			
Marital status ^b	-.00				.02			
Employment status ^b	.02	.56***	.31	.02	.03	.54***	.29	.02
3 Personal mastery	-.07	.56***	.31	.00	-.07	.54***	.29	.01
4 Kilocalorie expenditure	-.14*	.58***	.33	.02*	-.18**	.57***	.32	.03**
5 Number of hassles	.02	.58***	.33	.00	.03	.57***	.32	.00
6 Coping variables								
Engagement	.00				.00			
Disengagement	.04				.09			
Symptom management	-.03	.53***	.33	.00	.02	.57***	.33	.01
Total equation								
			R ² = .33				R ² = .33	
			F _(11,173) = 7.88***				F _(11,165) = 7.34***	
			Mean of DV = 1.71				Mean of DV = 1.66	
			SD = 1.93				SD = 1.88	

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix L

Table L-2

Hierarchical Multiple Regression of Home Management Activity (SIP-IH score; Time 3) on Home Management Activity, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 171)					Model B (n = 158)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 2 home management	.52***	.52***	.28	.28***	64.22***	.53***	.53***	.28	.28***	61.85***
2 <u>Demographic variables</u>										
Age	.13					.15				
Education ^b	-.03					-.03				
Marital status ^b	-.05					-.03				
Employment status ^b	.08	.54***	.29	.02	.91	.07	.55***	.30	.02	.93
3 Personal mastery	-.09	.55***	.30	.01	1.59	-.09	.55***	.31	.01	1.39
4 Kilocalorie expenditure	.00	.55***	.30	.00	.00	.00	.55***	.31	.00	.96
5 Number of hassles	.20*	.57***	.32	.03*	6.50*	.18*	.57***	.33	.02*	4.47*
6 <u>Coping variables</u>										
Engagement	.20**					.13				
Disengagement	.07					.05				
Symptom management	-.10	.60***	.36	.04*	3.22*	-.11	.59***	.35	.02	1.36
Total equation			<u>Model A</u> R ² = .36 F _(11,159) = 8.26***					<u>Model B</u> R ² = .35 F _(11,146) = 7.02***		
			Mean of DV = 1.56 SD = 1.81					Mean of DV = 1.65 SD = 1.85		

* β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix M

Table M-1

Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 2) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B).

Block Variables	Model A (n = 185)					Model B (n = 177)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 social interaction	.69***	.69***	.47	.47***	162.37***	.69***	.69***	.47	.47***	154.75***
2 <u>Demographic variables</u>										
Age	.02					-.01				
Education ^b	-.04					-.06				
Marital status ^b	-.09					-.08				
Employment status ^b	.02	.69***	.48	.01	.90	.04	.69***	.48	.01	.97
3 Personal mastery	-.05	.69***	.48	.00	.70	-.08	.70***	.49	.01	1.76
4 Kilocalorie expenditure	-.01	.69***	.48	.00	.01	-.01	.70***	.49	.00	.05
5 Number of hassles	.07	.70***	.49	.00	.98	.06	.70***	.49	.00	.81
6 <u>Coping variables</u>										
Engagement	.03					.04				
Disengagement	.08					.19**				
Symptom management	.01	.70***	.49	.01	.69	.12	.74***	.54	.05***	6.31***
Total equation										
			<u>Model A</u>					<u>Model B</u>		
			R ² = .49					R ² = .54		
			F (11,173) = 15.21***					F (11,165) = 17.72***		
			Mean of DV = 1.43					Mean of DV = 1.42		
			SD = 1.78					SD = 1.78		

^a β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix M

Table M-2

Hierarchical Multiple Regression of Social Interaction Functioning (SIP-SI score; Time 3) on Social Interaction Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 171)					Model B (n = 158)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 2 social interaction	.65***	.65***	.42	.42***	121.66***	.67***	.67***	.45	.45***	126.97***
2 <u>Demographic variables</u>										
Age										
Education ^b	.03					.05				
Marital status ^b	.05					.03				
Employment status ^b	.03					.05				
	.01	.65***	.42	.00	.30	.05	.67***	.46	.01	.46
3 Personal mastery	-.07	.65***	.43	.00	1.23	-.07	.68***	.46	.00	1.24
4 Kilocalorie expenditure	-.04	.65***	.43	.00	.31	-.02	.68***	.46	.00	.10
5 Number of hassles	.14	.66***	.44	.01	3.58	.11	.68***	.47	.01	2.00
6 <u>Coping variables</u>										
Engagement	-.04					-.13				
Disengagement	.05					.19**				
Symptom management	-.01	.67***	.44	.00	.28	.06	.71***	.50	.03*	3.33*
Total equation			<u>Model A</u>					<u>Model B</u>		
			R ² = .44					R ² = .44		
			F _(11,159) = 11.51***					F _(11,146) = 13.34***		
			Mean of DV = 1.19					Mean of DV = 1.28		
			SD = 1.78					SD = 1.84		

* B refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married); employment status (1=employed; 0=not employed).

* p < .05 ** p < .01 *** p < .001

Appendix N

Table N-1

Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 2) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 1), Time 1 Coping (Model A), and Time 2 Coping (Model B).

Block Variables	Model A (n = 73)					Model B (n = 69)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 1 work functioning	.66***	.66***	.44	.44***	55.32***	.66***	.66***	.44	.44***	52.29***
2 <u>Demographic variables</u>										
Age	.09					.14				
Education ^b	-.12					-.13				
Marital status ^b	.01	.67***	.45	.02	.70	-.03	.69***	.47	.03	1.28
3 Personal mastery	-.02	.67***	.45	.00	.02	-.06	.69***	.47	.00	.31
4 Kilocalorie expenditure	-.22*	.70***	.50	.04*	5.28*	-.24*	.72***	.52	.05*	5.96*
5 Number of hassles	.21	.72***	.52	.03	3.87	.20	.74***	.54	.02	3.29
6 <u>Coping variables</u>										
Engagement	-.11					-.04				
Disengagement	.10					.13				
Symptom management	.10	.73***	.54	.01	.64	.10	.75***	.56	.02	.84
<u>Total equation</u>										
			Model A					Model B		
			R ² = .54					R ² = .56		
			F (10,62) = 7.22***					F (10,58) = 7.46***		
			Mean of DV = 1.67					Mean of DV = 1.64		
			SD = 1.91					SD = 1.89		

* β refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married).

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix N

Table N-2

Hierarchical Multiple Regression of Work Functioning (SIP-Work score; Time 3) on Work Functioning, Demographic Variables, Personal Mastery, Kilocalorie Expenditure, Number of Hassles (Time 2), Time 2 Coping (Model A), and Time 3 Coping (Model B).

Block Variables	Model A (n = 87)					Model B (n = 82)				
	β^a	R	R ²	ΔR^2	ΔF	β^a	R	R ²	ΔR^2	ΔF
1 Time 2 work functioning	.72***	.72***	.52	.52***	90.53***	.72***	.72***	.52	.52***	85.31***
2 <u>Demographic variables</u>										
Age	.10					.13				
Education ^b	.01					-.02				
Marital status ^b	.05	.73***	.53	.01	.75	.07	.73***	.54	.02	1.25
3 Personal mastery	-.19*	.75***	.56	.03*	5.57*	-.20*	.76***	.57	.03*	5.63*
4 Kilocalorie expenditure	.11	.75***	.57	.01	1.85	.12	.77***	.58	.01	2.36
5 Number of hassles	.14	.76***	.58	.01	2.10	.06	.77***	.59	.00	.39
6 <u>Coping variables</u>										
Engagement	-.14					.07				
Disengagement	-.15					.11				
Symptom management	.10	.78***	.61	.03	2.15	.01	.77***	.60	.01	.88
Total equation			<u>Model A</u> R ² = .61 F _(10,76) = 12.05***					<u>Model B</u> R ² = .60 F _(10,71) = 10.67***		
			Mean of DV = 1.32 SD = 1.61					Mean of DV = 1.33 SD = 1.59		

^a B refers to the value of the beta (standardized partial regression) coefficient after the step in which the variable entered the model.

^b Education (1=post-secondary; 0=primary/secondary); marital status (1=married; 0=not married).

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix 0

Table 0-1

Zero-order Correlations* Between Predictor Variables at the Three Time Points (*N* ranges from 154 to 213).

	Coping Variables											
	Personal Mastery			Kilocalories			Number of hassles			Engagement		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Personal Mastery												
Time 1	--											
Time 2	.68	--										
Time 3	.66	.76	--									
Kilocalorie expenditure												
Time 1	.11	.11	.14	--								
Time 2	.13	.21	.21	.66	--							
Time 3	.26	.24	.26	.42	.60	--						
Number of hassles												
Time 1	-.43	-.51	-.45	-.04	-.09	-.25	--					
Time 2	-.37	-.53	-.47	-.02	-.11	-.24	.82	--				
Time 3	-.42	-.53	-.54	-.03	-.12	-.27	.79	.84	--			
Coping variables:												
Engagement												
Time 1	.06	.04	.00	.08	.07	-.05	.22	.18	.20	--		
Time 2	.04	.04	-.03	.05	.14	-.08	.18	.24	.19	.59	--	
Time 3	.01	.04	-.07	.07	.14	-.08	.25	.25	.24	.52	.54	--
Disengagement												
Time 1	-.34	-.40	-.38	.04	-.05	-.06	.46	.44	.42	.32	.31	.27
Time 2	-.33	-.44	-.42	.11	.03	-.13	.41	.49	.45	.14	.27	.13
Time 3	-.24	-.34	-.46	.04	.04	-.12	.33	.39	.43	.18	.21	.30
Symptom management												
Time 1	-.19	-.25	-.18	.15	.12	-.01	.45	.46	.39	.28	.32	.29
Time 2	-.20	-.33	-.27	.18	.07	-.03	.49	.49	.40	.27	.39	.34
Time 3	-.17	-.28	-.33	.19	.09	-.03	.44	.47	.46	.27	.32	.39
<i>N</i>	27.86	28.16	27.78	125.45	154.88	173.70	23.47	19.31	19.24	44.12	43.68	43.84
<i>SD</i>	5.41	5.36	5.58	34.77	46.32	59.99	13.75	13.60	13.28	24.59	25.63	22.41
<i>r</i>	.213	.199	.190	.197	.174	.154	.213	.198	.189	.195	.179	.161

Note. Time 1 (intake assessment); Time 2 (3 month assessment); Time 3 (6 month assessment).

* Pairwise comparisons with two-tailed significance.

* $p < .05$ ** $p < .01$ *** $p < .001$

Curriculum Vitae

Andrée M. Cazabon

EDUCATION

- September 1984 - Present University of Ottawa
Ph.D. Clinical Psychology (APA, CPA Accredited)
Degree expected: April, 1991
- Thesis: Determinants of Psychological and Social Adjustment
Among Cardiac Rehabilitation Patients: Personal Resources,
Stress and Coping Strategies.
- September 1983 - April 1984 University of Ottawa
B.A. Honours, Psychology
Degree Obtained: May 1984
- Thesis: Vocational, Social and Psychological Adjustment of
Rehabilitation Patients.
- September 1980 - April 1981 University of Ottawa
B.A. Concentration, Psychology
Degree Obtained: May 1981
- September 1977 - April 1980 University of Ottawa
B.A. Visual Arts
Degree Obtained: May 1980

SCHOLARSHIPS AND AWARDS

- June 1987 - June 1988 Ph.D. Studentship
Medical Research Council of Canada
- September 1984 - August 1987 Merit Scholarship
School of Graduate Studies and Research
University of Ottawa

May 1980 Dean's Honour List
 Faculty of Social Sciences, University of Ottawa

CLINICAL EXPERIENCE

September 1988 - Clinical Internship (APA, CPA Accredited)
 August 1989 Department of Psychiatry, University of Manitoba, Health
 Sciences Centre, Winnipeg, Manitoba.

Rotations on the Consultation-Liaison, Behavioural-Medicine, Family Therapy, and Adult Outpatient programs. Psychological and neuropsychological assessments of adult medical inpatients and outpatients and psychiatry outpatients. Individual child, adolescent, adult, couple, and family therapy utilizing both short-term and long-term therapy models. Optional experiences in court testimony, couple and group marital therapy, family therapy team consultation, and consultation to the Manitoba Adolescent Treatment Centre.

September 1986 - Clinical Internship
 August 1987 Department of Psychology, Children's Hospital of Eastern
 Ontario, Ottawa, Ontario.

Rotations on the Psycho-Educational, Behavioural and Social-Emotional programs, seminars in Family Therapy and Professional Issues. Psychological and psycho-educational assessments of francophone and anglophone psychology outpatients, medical inpatients, psychiatry inpatients and outpatients. Individual, couple, family, and group therapy. Consultations to inpatient service and social/community agencies.

June 1986- Co-Therapist
 August 1986 Cardiac Prevention and Rehabilitation Centre, University of
 Ottawa Heart Institute, Ottawa, Ontario.

Cognitive-behaviour therapy stress-management group for cardiac patients.

May 1985 -
August 1985

Clinical Practicum
Department of Psychology, Children's Hospital of Eastern
Ontario, Ottawa, Ontario.

Rotations on the Child Development Service and Behavioural
programs. Seminar in Family Therapy. Psychological
assessments of francophone and anglophone psychology
outpatients and medical inpatients. Consultations to inter-
disciplinary team and social agencies. Individual and family
therapy.

September 1984 -
April 1985

Clinical Practicum
Department of Psychology, Ottawa Board of Education, Ottawa,
Ontario.

Psycho-educational assessments of primary school francophone
and anglophone students, consultation to inter-disciplinary
educational team and parents.

RESEARCH EXPERIENCE

July 1986 -
August 1986

Research Assistant
Department of Psychology, Children's Hospital of Eastern
Ontario.

Study: The Development of Reciprocal Social Interactions and
Free Play Skills Among Developmentally Handicapped and
Nonhandicapped Preschoolers in Integrated Settings: An
Observational and Intervention Study. Responsibilities included
review of literature and assisting in writing the research grant
which was subsequently funded by the Ontario Ministry of
Health.

January 1986 -
June 1986

Research Assistant
Department of Psychology, Montreal Children's Hospital.

Study: Long-Term Neuro-Developmental Outcomes of
Meningitis in Children. Responsibilities included
neuropsychological testing of post-meningitis children and their
siblings aged 6-14.

January 1985 -
May 1985

Research and Administrative Assistant
School of Psychology, University of Ottawa.

Responsibilities included assisting Dr. P. Ritchie in carrying out short-term projects for provincial and national psychological associations.

November 1983 -
August 1984

Research Assistant
Health Care Research Unit, Department of Epidemiology and Community Medicine, Faculty of Health Sciences, University of Ottawa.

Study: The Motor Control Assessment: An Instrument to Measure Outcomes of Physiotherapy in Physically Handicapped Children. Responsibilities included liaison with treatment centres, coordination of data collection from multiple sites, data management and analysis, and report writing.

May 1984 -
August 1984
and
July 1983 -
August 1983

Research Assistant
Health Care Research Unit, Department of Epidemiology and Community Medicine, Faculty of Health Sciences, University of Ottawa.

Study: Community-Based Health Promotion Program. Responsibilities included data management, planning and conducting of data analyses.

October 1981 -
March 1983

Research Consultant
Directorate of Behavioural Research and Evaluation,
Department of Communications, Government of Canada,
Ottawa, Ontario.

Independently conducted a number of studies on Telidon videotex information retrieval system. Responsibilities included designing and conducting human factors research, data management, analysis and final report writing.

July 1980 -
May 1981

Research Assistant
School of Psychology, University of Ottawa.

Study: Comparative Effectiveness of Assertiveness Training Approaches. Responsibilities included rating videotaped

assertiveness training sessions and role-playing to elicit behavioral responses of subjects.

January 1981 -
August 1981

Research Assistant
School of Psychology, University of Ottawa.

Study: Pre-Menstrual Tension and Mother-Child Relations.
Responsibilities included rating videotaped mother-child interactions.

UNIVERSITY TEACHING EXPERIENCE

May 1990

"A la découverte de soi". Enrichment Course, Service for Continuing Education, University of Ottawa.

September 1986

PSY 1200 Introductory Psychology. Fall and Winter trimesters, School of Psychology, University of Ottawa.

TEACHING ASSISTANTSHIPS

January 1987

EPI 5342 Analytic Procedures in the Health Sciences. Winter trimester, Department of Epidemiology and Community Medicine, University of Ottawa.

January 1985

PSY 3107 Psychometric Methods. Winter trimester, School of Psychology, University of Ottawa.

September 1984
and
September 1985

PSY 4175/4575 Computer Analysis of Psychological Data. Fall trimester, School of Psychology, University of Ottawa.

PUBLICATIONS

Hotz, S. B., Cazabon, A., O'Farrell, P., & Robbins, B. (in press). Adjustment to Heart Disease: Helping Families Cope. *Canadian Family Physician*.

- Cazabon, A. (1983). Graphics and Textual Cues on Telidon: Spatially Orienting Users in Information Retrieval, *Technical Memorandum*, Serial No. 82-9.
- Cazabon, A. and Whalen, T. (1983). A Description of Browsing on a Telidon System by Naive Users, *Technical Memorandum*, Serial No. 82-5.
- Cazabon, A. and Whalen, T. (1982). Recommended Practices in the Development of a Videotex Database, *Technical Memorandum*, Serial No. 82-3.
- Cazabon, A. (1982) (in collaboration). The Department of Communications Communicating Word Processor Network Pilot Trial, Division of Development and Engineering, Government Telecommunications Agency.

INVITED ADDRESSES

- | | |
|---------------|--|
| June 1989 | Studying the Process of Coping: Methodological Issues. Department of Psychiatry, St. Boniface Hospital. Winnipeg, Manitoba. |
| December 1988 | Facilitating Adjustment to Medical Illness. Department of Psychiatry, Health Sciences Centre. Winnipeg, Manitoba. |
| October 1988 | Theoretical Models of Stress and Coping. Department of Psychiatry, Health Sciences Centre. Winnipeg, Manitoba. |
| August 1986 | Coping and Adaptation to Myocardial Infarction. Cardiac Prevention and Rehabilitation Centre, University of Ottawa Heart Institute. Ottawa, Ontario. |
| February 1982 | Present Telidon Technology and Future Applications. "Regroupement des ontariens de l'est". Ottawa, Ontario. |

PROFESSIONAL ACTIVITIES

- | | |
|----------------------------------|---|
| June, 1990 -
October 1990 | Student Representative.
Task Force on a Clinical Training Consortium for the Ottawa-Hull Region, School of Psychology, University of Ottawa. |
| February 1986 -
February 1987 | Membership Coordinator.
Section on Students in Psychology,
Ontario Psychological Association. |

September 1985 - University Representative.
May 1987 Section of Students in Psychology,
Ontario Psychological Association.

PROFESSIONAL DEVELOPMENT ACTIVITIES

Workshops

Clinical Application of the MMPI-2 by James N. Butcher, Ph.D., Ottawa, Ontario.
October, 1990.

Family Therapy with AIDS Patients by The Ackerman Institute, Winnipeg, Manitoba.
March 1989.

Cognitive-Behaviour Therapy by Donald Meichenbaum, Ph.D., Toronto, Ontario.
February, 1986.

Cognitive-Behavioural Techniques for Treating Impulsive Children: Educational
Applications by Philip Kendall, Ph.D., Ottawa, Ontario. October, 1985.

Cognitive Therapy for Depression by Brian Shaw, Ph.D., Toronto, Ontario. November,
1984.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Canadian Psychological Association
Ontario Psychological Association