

THE EFFECTS OF A MEDICALLY SUPERVISED GROUP EXERCISE  
PROGRAM ON THE SELF-CONCEPT AND LIFE STYLE  
OF CARDIAC PATIENTS

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BY

MOON SHAO-CHUANG CHEN, JR., B.S., M.S., M.P.H.

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We hereby recommend that the dissertation prepared under  
our supervision by MOON SHAO-CHUANG CHEN, JR.

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be accepted as fulfilling this part of the requirements for the Degree of  
Doctor of Philosophy

Committee:

Don Merki

Chairman, Department  
of Health Education

Don Merki

Chairman

Fred E. Deeford

Young E. Gross, M.D.

Basil J. Hamilton

Ruth E. Tandy

Melba S. Baldwin

Marilyn Benson

Dean, College of  
Health, Physical  
Education, and  
Recreation

Accepted:~

Phyllis Bridges

Dean of The Graduate School



DEDICATION

to  
CATHERINA,  
  
my wife,  
  
my helpmate,  
  
my love

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## CHAPTER I

### ORIENTATION TO THE STUDY

#### Rationale for the Study

Approximately one out of every two individuals now survive their first heart attack.<sup>1</sup> For survivors, this brush with death carries with it more than the obvious physiologically threatening consequences. The myocardial infarction is often an event initiating a chain reaction rippling with social and psychological implications.

The heart attack often leaves an imprint of immediate vulnerability upon survivors. Many victims long remember their pain, loss of consciousness, and helplessness which occurred during their attack. The thought of these re-occurrences shadow one's memories.

Among the areas of the victim's life most likely to be affected are family, finances, and self-concept. These areas are discussed in subsequent paragraphs.

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<sup>1</sup>United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare. Publication No. (NIH) 76-750. Washington, D.C.: 1976], p. 3.

After the cardiac event, the significance of roles and relationships among family members is accentuated. In some cases, there is an unwilling forfeit of the dominant male role; in others, there is a strengthening of the family unit.

The prospects of an increased financial burden and loss of potential earnings pose additional problems. The handling of an uncertain financial future is an indication of the patient's coping patterns.

Patients' coping patterns to the effects of the myocardial infarction include anxiety, aggression, depression, or denial.<sup>1</sup> Changes in self-concept have been traced through five stages from that of being a "fragile survivor", while in the hospital, to that of a "man who once had a heart attack", one year afterwards.<sup>2</sup> The cumulative result is often a lowering of the self-esteem. This appraisal is further reinforced by family, friends, and fellow-workers.

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<sup>1</sup>Sydney Croog and Sol Levine, The Heart Patient Recovers: Social and Psychological Factors (New York: Human Sciences Press, 1977), p. 29.

<sup>2</sup>Roberta K. Idelson, Sydney H. Croog, Sol Levine, "Changes in Self-Concept During the Year After A First Heart Attack: A Natural History Approach," American Archives of Rehabilitation Therapy 21 (March 1974): 13.



Although controversial, exercise therapy has been effective in countering the trend toward self-devaluation and depression.<sup>1</sup> Salubrious alterations in life habits have also accrued.<sup>2</sup>

The benefits of exercise therapy alluded to in the previous paragraph have been the bases for the approximately one hundred medically supervised group exercise centers in this nation. Among these centers, the Dallas

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<sup>1</sup>B. D. McPherson et al., "Psychological Effects of an Exercise Program for Post-Infarct and Normal Adult Men," Journal of Sports Medicine and Physical Fitness 7 (June 1967): 95-101; Herman K. Hellerstein et al., "The Influence of Active Conditioning Upon Subjects with Coronary Heart Disease: A Prognosis Report," Canadian Medical Journal XCVI (March 1967): 901-903; Stanley Fisher, "Unmet Needs in Psychological Evaluation of Intervention Programs," in Exercise Testing and Exercise Training in Coronary Heart Disease, eds. John P. Naughton, Herman K. Hellerstein, and Irving C. Mohler (New York: Academic Press, 1973), pp. 289-296; Thomas P. Hackett and Ned H. Cassem, "Psychological Aspects of Myocardial Infarction and Coronary Care," eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company, 1975), p. 147.

<sup>2</sup>Herman K. Hellerstein et al., "The Influence of Active Conditioning Upon Subjects with Coronary Heart Disease: A Prognosis Report," Canadian Medical Journal XCVI (March 1967): 901-903; Herman K. Hellerstein and Ernest H. Friedman, "Sexual Activity and the Post-Coronary Patient," Archives of Internal Medicine 125 (June 1970): 987-999; John P. Naughton et al., "Rehabilitation Following Myocardial Infarction," American Journal of Medicine 46 (May 1969): 725-733; John P. Naughton, "Physical Activity and Coronary Heart Disease," in Adult Fitness and Cardiac Rehabilitation, ed. Philip K. Wilson (Baltimore: University Park Press, 1975), pp. 6-7.

Cardiac Institute is in the top ten in number of cardiac patients enrolled.<sup>1</sup>

Physiological monitoring is routine at all centers involved with exercising cardiac patients. The deficiency, however, lies in the lack of longitudinal psychological assessments of patients' changes in self-concept and life style. First, there appears to be little or no continuing, objective recordings of patients' feelings about themselves and their life style changes as they engage in exercise-centered cardiac rehabilitation programs. Second, few, if any investigators have examined the effects of medically supervised group exercise programs on participants' self-concept and life style. To date, measurement and reporting of exercising cardiac patients' psychological reactions and life style adjustments remain a relatively uncharted desert.

The 1974 Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute addressed itself to this issue of the role of exercise in cardiac rehabilitation. Specifically, the Task Force identified the

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<sup>1</sup>Michael M. Dehn 1978: personal communication.

psychological effects of early ambulation and exercise therapy as recommended areas for research.<sup>1</sup>

Thus, the paucity of research in this field and the proximity of one of the nation's largest exercise-centered cardiac rehabilitation programs to this investigator served as the impetus for this study. The findings from this study will contribute to knowledge about the self-concept and life style changes of cardiac patients as a result of a medically supervised group exercise program. Rejection of any of the null hypotheses will signify the efficacy of exercise therapy to improving (a) certain aspects(s) of self-concept and life style among cardiac patients.

#### Purpose of the Study

The purpose of this investigation was to determine the effects of a medically supervised group exercise program on the self-concept and life style of cardiac patients.

#### Statement of the Problem

The intent of this investigation was to determine whether participation in a medically supervised group exercise program (specifically that of the Dallas Cardiac

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<sup>1</sup>United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750. Washington, D.C.: 1976], pp. 77, 79.

Institute) enhanced more favorably self-concept and life style changes than non-participation. For the purposes of this study, cardiac patients who participated in the medically supervised group exercise program were designated as the composite experimental group. Patients prescribed this same medically supervised group exercise program but who never have participated were designated as the control group.

The potential pool for subjects qualified to be in the control group was thirty-seven, but only nineteen patients chose to participate in the study. Thirty-two out of approximately one hundred and fifty qualified experimental group subjects chose to participate in the study. Volunteers within each group were compared twice with respect to self-concept and life style factors. This was accomplished by means of the two instruments especially created for this investigation: the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale (see definitions).

Evidence of the effectiveness of the treatment (independent variable) was made by comparing scores on self-concept and life style change factors (dependent variables) attained by the experimental group against the control group.

### Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

- A. There is no significant difference between the experimental group (see definitions) and the control group (see definitions) with respect to each facet of self-concept as measured by the Dallas Cardiac Self-Concept Scale (see definitions).
- B. There is no significant difference between the experimental group and the control group with respect to each factor of life style change factors as measured by the Life Style Change Factors Scale (see definitions).

### Definition of Terms

Cardiac patients: Cardiac patients in this study were defined as outpatients who have been diagnosed by a physician as having or having had a heart condition such as chest pains, angina pectoris, myocardial infarction, hypertension, open heart surgery, or the like, or any combination of the heart conditions mentioned above.

Control group: This group was similar to the group having the characteristics being studied except for the variable being investigated.<sup>1</sup>

Dallas Cardiac Institute: The Dallas Cardiac Institute is a non-profit organization of physicians and other health professionals. Its major function is cardiac rehabilitation through medically supervised exercise and patient education. The exercise sites for the Dallas Cardiac Institute are the Town North Young Men's Christian Association (4332 Northaven) and the Dedman Center on the campus of Southern Methodist University. Both sites are in Dallas, Texas.

Dallas Cardiac Self-Concept Scale: This name was given to the instrument especially designed by the investigator for this study. Its purpose was to measure self-concept among cardiac patients by means of a semantic differential format. It consisted of a randomly sequenced core set of thirteen scales for measuring each of eight operationally defined facets of self-concept.

Experimental group: This group of subjects was the group exposed to the experimental treatment.

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<sup>1</sup>Walter R. Borg and Meredith D. Gall, Educational Research: An Introduction (New York: David McKay Company, Inc., 1971), p. 302.

Expert jury: This group of five individuals was invited to weigh the relative importance of life style factors (except life priorities) on the Life Style Change Factors Scale. These individuals were selected because of their expertise in cardiac rehabilitation or instrument evaluation.

Life Style Change Factors Scale: This name was given to the instrument especially created by the investigator for this investigation. Its purpose was to measure the relative importance of various factors in an individual's life style that are likely to be affected by one or more cardiac disorders. This instrument consisted of ten factors that utilized the semantic differential technique and asked for a priority ranking of seven areas of an individual's life.

Medically Supervised Group Exercise Program: This was operationally defined as forty-five minutes of dynamic exercise in the company of other cardiac patients and under the direct supervision of a physician and an exercise physiologist at the exercise site. The exact nature of the exercise was individually prescribed. Its pace was evaluated by daily monitoring of heart rate, blood pressure, and an electrocardiogram.

Self-concept: "Self-concept is a person's total view of himself and his appraisal of what he sees."<sup>1</sup>

#### General Design of the Study

The basic research scheme involved the nonequivalent control group design. The common attribute of all subjects was that all had been prescribed the DCI exercise program by their physicians. The differentiating attribute was whether they participated in the DCI exercise sessions. There was a total of thirty-two white, male cardiac patients who composed the experimental group. The control groups subjects did not participate in any of the DCI exercise sessions. There was a total of nineteen white, male cardiac patients who composed the control group.

Testing of the null hypotheses of no significance between the experimental and the control groups was performed by analyses of covariance. These analyses of covariance were based on the two administrations of the testing instruments, the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale.

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<sup>1</sup>Carroll I. Cook, "Self-Concept of the Myocardial Infarction Patient", The Canadian Nurse 72 (October 1976): p. 37.



Delimitations of the Study

The study was subject to the following delimitations:

- A. The degree of cooperation with the staff and trustees of the Dallas Cardiac Institute
- B. The degree of cooperation with those designated as experimental subjects and those designated as control subjects
- C. The degree to which the experimental group subjects and the control group subjects were representative of exercising and non-exercising cardiac patients, respectively
- D. The degree of accuracy to which respondents replied to the items on the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale
- E. The degree with which each person understood items on the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale
- F. The objectivity, reliability, validity, and administrative feasibility of the instruments in this study

### Summary

Exercise therapy has been documented as having beneficial effects on the self-perception and life style of cardiac patients. This type of treatment was investigated to delineate differences in self-concept and life style between two groups of cardiac patients. Both groups had been prescribed the same medically supervised group exercise regimen. One group chose to participate, the other group did not.

This chapter included the rationale, purpose, statement of the problem, hypotheses, definition of terms, general design, delimitations, and the summary.

Chapter II includes a review of the related literature. The two aspects reviewed are: (1) a history of psychological and physiological testing of exercising cardiac patients, and (2) psychosocial aspects of exercise therapy for cardiac patients.

## CHAPTER II

### SURVEY OF SELECTED RELATED LITERATURE

A review of the available literature relating to medically supervised group exercise programs and measurement of self-concept and life style of cardiac patients disclosed that the present investigation does not duplicate any previous study. For an organized presentation, the review of literature is divided into two sections: (1) a history of psychological and physiological testing of exercising cardiac patients, and (2) psychosocial aspects of exercise therapy for cardiac patients.

#### History of Psychological and Physiological Testing of Exercising Cardiac Patients

Hellerstein reported that as early as 1772, Heberden observed the beneficial effects of a probable infarct patient sawing wood for thirty minutes daily over a six month period. However, he added, it was not until 1912 that the phenomenon of a myocardial infarction was first described by Herrick. It was he who set the standard for treatment of myocardial infarctions by prescribing a minimum of physical exercise for convalescing cardiac patients

and by prohibiting strenuous exercise such as climbing stairs for a year after hospital discharge.<sup>1</sup>

Forty years later, Levine and Lown first questioned enforced, prolonged bedrest regimen following heart attacks and allowed patients to sit up in an armchair during the first ten days after a heart attack. The result was a significant lowering of morbidity and mortality rates.<sup>2</sup> Meanwhile, Goldwater in the 1940s, and Hellerstein in 1950, had demonstrated an increased return to work capability of cardiac patients.<sup>3</sup> In the late 1960s, investigators from different parts of the world claimed several psychological advantages for exercising cardiac patients.<sup>4</sup>

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<sup>1</sup>Herman K. Hellerstein, "Rehabilitation of the Postinfarction Patient," Hospital Practice 7 (July 1972): 45.

<sup>2</sup>John Naughton et al., "Rehabilitation Following Myocardial Infarction," American Journal of Medicine 46 (May 1969): 752.

<sup>3</sup>Ibid.

<sup>4</sup>B. D. McPherson et al., "Psychological Effects of an Exercise Program for Post-Infarct and Normal Adult Men," Journal of Sports Medicine and Physical Fitness 7 (June 1967): 95-101; John Naughton, John Bruhn, and Michael Lategola, "Effects of Physical Training on Physiological and Behavioral Characteristics of Cardiac Patients," Archives of Physical Medicine and Rehabilitation 49 (March 1968): 131-137.

An elaboration of these psychological advantages is provided in Table 2.

In 1970, Heinzelmann and Bagley reported on their study of exercising coronary risk men. This study compared two randomly formed groups of middle-aged (ages 45 to 59), previously sedentary, coronary risk men. Supervised physical activity was the differentiating variable between an exercising experimental group and a control group. Exercisers allegedly developed more positive self-images affecting their outlook on life and decreasing their feelings of vulnerability to heart attacks. Additionally, exercisers reported significantly greater capacities for both physical and mental work, significantly more frequent positive feelings about health, and greater changes in life style compared with the control group.<sup>1</sup>

In 1973, Ismail and Trachtman noted both physiological and psychological gains for otherwise physically unfit men. Physiologically, improvements were registered on such cardiac conditions as heart rate, pumping capacity of the heart, and blood pressure. Psychologically, specific gains

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<sup>1</sup>Fred Heinzelmann and Richard Bagley, "Response to Physical Activity Programs and Their Effects on Health Behavior," Public Health Reports 85 (October 1970): 908-911.

in self-sufficiency, imaginativeness, and emotional stability were observed among previously "low fit" men.<sup>1</sup>

For coronary heart disease patients, considerable evidence also exists on the physiological and psychological benefits of exercise. Much writing has been done in this area. In terms of physiological benefits, Enselberg summarized opinions expressed by many that physical activity reduced the manifestation of coronary heart disease.<sup>2</sup> Additionally, physical training resulted in increased exercise tolerance and decreased anginal pain. Fletcher and Cantwell also cited work conducted by various investigators supporting extensive physiological advantages for exercising coronary heart disease patients.<sup>3</sup>

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<sup>1</sup>A. H. Ismail and L. E. Trachtman, "Jogging the Imagination," Psychology Today 6 (March 1973): 81-82.

<sup>2</sup>Charles D. Enselberg, "Physical Activity and Coronary Heart Disease," American Heart Journal 80 (July 1970): 137-138.

<sup>3</sup>Gerald F. Fletcher and John D. Cantwell, Exercise in the Management of Coronary Heart Disease: A Guide for the Practicing Physician (Springfield, Illinois: Charles C. Thomas, 1971).

In terms of psychological benefits, Hackett and Cassem proclaimed that, "exercise and physical conditioning are perhaps the most crucial interventions in helping the patient to attain a renewed feeling of independence and rehabilitative progress." Thus, the effect of this activity was believed to be the best approach to restoring a patient's self-esteem.<sup>1</sup>

On the negative side of the ledger, Fletcher and Cantwell cautioned about the unequivocal acceptance of exercise therapy effectiveness. They warned that while group exercise appeared to be the most enjoyable form of therapy, it was potentially the most dangerous.<sup>2</sup>

Other disadvantages of exercise therapy for post-infarction patients were discussed by Blackburn.<sup>3</sup> In summary, the controversy surrounding exercise therapy for coronary patients centers around the insufficient evidence of the beneficial effect of intensive exercise on other risk

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<sup>1</sup>Thomas P. Hackett and Ned H. Cassem, "Psychological Intervention in Myocardial Infarction," in Psychological Aspects of Myocardial Infarction and Coronary Care, eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company, 1975), p. 147.

<sup>2</sup>Gerald F. Fletcher and John D. Cantwell, Exercise in the Management of Coronary Heart Disease: A Guide for the Practicing Physician (Springfield, Illinois: Charles C. Thomas, 1971).

<sup>3</sup>Henry Blackburn, "Disadvantages of Intensive Exercise Therapy After Myocardial Infarction," in Controversy in Internal Medicine II, eds. F. J. Ingelfinger et al., (Philadelphia: W. B. Saunders Company, 1974), pp. 163-165.

factors or on the rate of recurrent infarction and death.<sup>1</sup> While it appears too early to correlate exercise with reduced morbidity and mortality, the evidence clearly points to exercise training programs as being safe, helpful, and psychologically uplifting.<sup>2</sup>

The findings of the psychological testing of exercising cardiac patients are chronologically presented in the succeeding pages. Two tables are displayed. The first table, "Psychological Testing of Cardiac Patients With No Indication of Exercise Therapy" is intended to compliment the second table, "A History of Psychological Testing of Exercising Cardiac Patients". A comparison of these two types of investigations will help delineate the psychological influences of exercise.

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<sup>1</sup>Ibid.

<sup>2</sup>Charles D. Enselberg, "Physical Activity and Coronary Heart Disease," American Heart Journal 80 (July 1970: 137-138); Robert A. Bruce, "The Benefits of Physical Training for Patients with Coronary Heart Disease," in Controversy in Internal Medicine II, eds. F. J. Ingelfinger et al., (Philadelphia: W. B. Saunders Company, 1974), p. 159; United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750. Washington D. C.: 1976], p. 24



TABLE 1  
Psychological Testing of Cardiac Patients With No Indication of Exercise Therapy  
(Selected References)\*

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Wynn <sup>1</sup> (Australia)	1967	400	no	Referral to Work Assessment Center	Interviews and Staff Conferences	Unwarranted emotional distress and invalidism (50% of subjects) Disability due to nervous factors greater than due to heart disease
Wishnie Hackett Cassem <sup>2</sup> (USA)	1971	24	no	Volunteer patients first seen by one of the investigators	Interviews	15/24 had disturbed sleep; 9/14 failed to stop smoking; 13/24 returned to work; 7/9 who determined to lose weight, failed to do so.

\*Footnotes are listed on page 26.

TABLE 1--Continued

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Theorell and Røge <sup>3</sup> (Sweden)	1972	171	yes	Sixty-two post-MI** Swedish male survivors compared with 109 subjects free of coronary heart disease	CHD*** Behavior and Life Satisfaction Questionnaire	Data not comparable since responses were directed to pre-MI events.
Idelson Croog <sup>4</sup> Levine <sup>4</sup> (United Kingdom)	1974	11	no	Case analyses of selectively assigned, white, married men recovering from first MI	One hundred interviews with 11 men and 10 of their wives	Five major stages of changes in self-concept noted from hospitalization to one year after discharge
Croog and Levine <sup>5</sup> (USA)	1977	293-345	no	Data collection at three post-infarct stages: 18 da., 1 1/2 mo., and 1 yr. (Selected case studies reported by Idelson et al.)	Patient interviews; spouse or relative interviews; physician questionnaires	Sixteen deaths. Post-infarct (11 mo.) about 25% or so developed other significant disease processes. Pre-infarct personality and occupation determine post-infarct coping patterns

Footnotes are listed on page 26.

\*\*MI = myocardial infarction

\*\*\*CHD = coronary heart disease

TABLE 1--Continued

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Finlayson* and McEwen <sup>6</sup> (United Kingdom)	1977	76	no	Surveys of men with first MI after six months and four years. Patients' wives interviewed while patients were in hospital and also one year later.	Interviews with patients and wives	Seventy-two per-cent returned to former employment; on the whole, less physically and socially active. Generally negative attitudes to illness and present health after four years.

\*Footnotes are listed on page 26.

TABLE 2

## A History of Psychological Testing of Exercising Cardiac Patients\*

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results	
McPherson, R. D. et al. <sup>7</sup> (Canada)	1967	45	yes	Observations and comparisons of one group of cardiac exercisers versus cardiac controls.	Cattell's 16-PF questionnaire; Manifest Anxiety Scale; Me As I Typically Am; McPherson-Yuhaz Attitude Toward Exercise and Physical Activity Inventory; Confidential questionnaire (to wives)	Cardiac Exercisers showed slightly more personality changes than cardiac controls.	22
Plavšić, et al. <sup>8</sup> (Yugoslavia)	1968	16	no	Diet, resting, sleeping, counseling	Interviews; Cornell Index N/4; Rosenzweig's picture frustration scale;	Patients significantly more worried and hypochondrical.	

\*Footnotes listed on page 26.

TABLE 2--Continued

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Naughton, Bruhn, Lategola <sup>9*</sup> (USA)	1968	28	yes	Medically supervised physical activity program 3-6 months post-infarct. Education on value of exercise.	Byrne's scale of repression-sensitization; Plutchik's profile index of emotions; multidimensional scale of personality assessment.  Minnesota Multiphasic Personality Inventory and one hour interviews.	Insignificant results on depression but alterations in life habits (e.g. compared with controls, exercisers had "longer restful sleep," "improved attitudes toward job")

\*Footnotes are listed on page 27.

TABLE 2--Continued

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Kellerman, et al. <sup>10*</sup> (USA)	1968	55	no	Physical activities, e.g. gardening and calisthenics	Rorschach Draw-A-Person, Bender Gestalt, Rosenzweig Picture Frustration Test	"Only a few results are available for research and statistical analysis." "Marked psychological profit." "Increase in emotional stability."
Askansas <sup>11</sup> (Poland)	1969	161	yes	Use of "therapeutic gymnastics" and psychotherapy.	Modified tapping test; Couvre test of concentration and attention; Thematic Apperception test; Wartegg's test; Catell's questionnaire; Rumbaugh cardiac adjustment scale.	Experimental group had improved concentration and better attitude toward illness.

\*Footnotes are listed on page 27.

TABLE 2--Continued

Investigators	Year Reported	Number of Subjects	Use of Control Group	Procedures	Instruments	Results
Hellerstein <sup>12</sup> (USA)	1970	75- 100	no	Physical conditioning program included weight control, rest, continued work, good nutrition, abstinence from tobacco.	Holzmann Inkblot Test; Minnesota Multiphasic Personality Inventory; Rosenman-Friedman taped interview	Significant decrease depression ( $p < .01$ ); more positive attitude toward work, more energetic, more work, better sleep.

Footnotes are listed on page 27

## FOOTNOTES TO TABLES 1 AND 2

<sup>1</sup>Allan Wynn, "Unwarranted Emotional Distress in Men With Ischaemic Heart Disease (IHD)" The Medical Journal of Australia 2 (November 1967): 847-851.

<sup>2</sup>H.A. Wishnie, T.P. Hackett, and N. H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction" American Medical Association Journal Vol 215, No. 8 (February 1971): 1292-1296.

<sup>3</sup>Tores Theorell and Richard Rage, "Behavior and Life Satisfaction Characteristics of Swedish Subjects with Myocardial Infarctions", Journal of Chronic Diseases 25 (March 1972): 139-147.

<sup>4</sup>Roberta Idelson, Sydney Croog, and Sol Levine, "Changes in Self-Concept During the Year After a First Heart Attack: A Natural History Approach," American Archives of Rehabilitation Therapy, 22, 1 (March 1974), pp. 10-21; and 22, 2 (June 1974), pp. 25-31.

<sup>5</sup>Sydney Croog and Sol Levine, The Heart Patient Recovers: Social and Psychological Factors (New York: Human Sciences Press, 1977); pp. 31, 43, 349.

<sup>6</sup>Angela Finlayson and James McEwen, Coronary Heart Disease and Patterns of Living (New York: Prodist, 1977), pp. 17, 195, 212-213.

<sup>7</sup>B. D. McPherson et al., "Psychological Effects of an Exercise Program for Post-Infarct and Normal Adult Men," Journal of Sports Medicine and Physical Fitness VII (1976), 95-102.

<sup>8</sup>Stanley Fisher, "Unmet Needs in Psychological Evaluation of Intervention Programs" in Exercises Testing and Exercise Training in Coronary Heart Disease (New York: Academic Press, 1973), pp. 289-296.



FOOTNOTES TO TABLES 1 AND 2--Continued

<sup>9</sup>John Naughton, J. G. Bruhn, and M. T. Lategola, "Effects of Physical Training on Physiological and Behavioral Characteristics of Cardiac Patients", Archives of Physical Medicine and Rehabilitation 49 No. 3 (March 1968): 131-137.

<sup>10</sup>Fisher, "Unmet Needs" in Exercise Testing, pp. 289-296.

<sup>11</sup>Fisher, "Unmet Needs" in Exericse Testing, pp. 289-296.

<sup>12</sup>Fisher, "Unmet Needs" in Exercise Testing, pp. 289-296.

The preceeding pages provided an historical summary of the psychological testing of exercising cardiac patients. Since 1952, when the change to encouraging exercise of post-infarction patients was made, investigators have demonstrated that exercise therapy provides beneficial physiological and psychological advantages. In the next section, the literature on psychosocial aspects of exercise therapy for cardiac patients is reviewed.

#### Psychosocial Aspects of Exercise Therapy for Cardiac Patients

In late 1974, the National Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute recommended for further research "the effects of supervised early ambulation and exercise therapy on the rehabilitation outcome of selected myocardial infarction survivors"<sup>1</sup> and the need "to study psychosocial factors involved in cardiac rehabilitation".<sup>2</sup>

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<sup>1</sup>United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750]. (Washington, D. C.: 1976), p. 77.

<sup>2</sup>Ibid., p. 79.

The review by this Task Force described the problem coronary heart disease posed for rehabilitation. Each year more than 670,000 Americans survive myocardial infarctions, the most accurate clinical manifestation of coronary heart disease. For many of these who do survive heart attacks, the major barrier to complete rehabilitation is not physiological, but psychosocial.

"Optimal adjustment" according to the Task Force Report was operationally difficult to define but included as important aspects the following: "Return to one's role within the family, leisure time activity, or to work . . ."<sup>1</sup> Previous research on these aspects and others broadly considered within the scope of psychosocial aspects of exercise therapy for cardiac patients will be reviewed in this section.

Naughton reviewed participation of cardiac patients in exercise therapy programs in the past fifteen to twenty years. He commented that these programs have been characterized by their consideration of the individual patient's capacity and the progression from very low levels of physical activity to increasing levels of physical intensity. Despite the use of different exercise prescriptions

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<sup>1</sup>Ibid., p. 3.

(e.g. calisthenics, games, walking-jogging, and swimming), the effects have been basically the same. In addition to physiological enhancements, ameliorating psychosocial and behavioral life style changes have also been claimed. Specifically, exercising cardiac patients allegedly perceived their own health and their attitudes toward home and job more favorably. In terms of behavioral life style changes, subjects reported improved dietary control, sleep patterns, and sexual adjustments. By contrast, postrecovery coronary patients who remained sedentary did not register equivalent physiological, psychosocial, or behavioral life style improvements. Thus, successful cardiac rehabilitation may be indicated by various psychosocial or behavioral life style change indices.<sup>1</sup>

Among the psychosocial and behavioral life style indices most frequently utilized in measuring cardiac rehabilitation outcomes are the following: return to one's role within the family, return to work, and the patient's self-perception. Each of these indices is discussed successively in greater detail.

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<sup>1</sup>John P. Naughton, "Physical Activity and Coronary Heart Disease," in Adult Fitness and Cardiac Rehabilitation ed. Philip K. Wilson (Baltimore: University Park Press, 1975), pp. 6-7.

First, the return of the cardiac patient to his previous functioning within the family seemed to be considered an index of successful cardiac rehabilitation.<sup>1</sup> However, the exact role of the family in contributing to cardiac rehabilitation remains to be clearly delineated.<sup>2</sup> Wishnie et al., Garrity, the Task Force Report, and Wagner testified about the pivotal role the spouse played in the way the patient felt about himself. A spouse could either enhance the patient's self-concept or severely undermine it.<sup>3</sup>

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<sup>1</sup>United States Department of Health, Physical Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750. Washington, D.C.: 1976], p. 14.

<sup>2</sup>Ibid.

<sup>3</sup>H.A. Wishnie, T. P. Hackett, and N.H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction," Journal of the American Medical Association 215 (February 1971): 1292-1296; Thomas F. Garrity, "Morbidity, Mortality, and Rehabilitation," in Psychological Aspects of Myocardial Infarction and Coronary Care, eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company, 1975): pp. 129-130; United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750. Washington, D.C.: 1976], p. 14; N. Wagner, "Some Sexual Aspects of the Rehabilitation of Cardiac Patients," in Psychological Approach to the

In the sexual sphere the patient's feelings of anxiety, fear of death, and sense of impotence are often intensified. This affects his sexual performance.<sup>1</sup> Consequently, as noted by Hellerstein and Friedman, sexual activity decreased after a heart attack.<sup>2</sup> However, this need not be the case. Hellerstein observed that the energy expended in sexual intercourse to be approximately equivalent to climbing two flights of stairs. This energy expenditure is normally within a post-coronary patient's capability. Yet unjustified fears of probable death from over-exertion sometimes led to unwarranted abstinence.<sup>3</sup> Hellerstein noted that a resumption of normal sexual

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Rehabilitation of Coronary Patients, ed. U. Stocksmeier (Berlin: International Society of Cardiology Scientific Council on Rehabilitation of Cardiac Patients, 1976), pp. 118-128.

<sup>1</sup>Nathaniel Wagner, "Some Sexual Aspects of the Rehabilitation of Cardiac Patients," in Psychological Approach to the Rehabilitation of Coronary Patients, ed. U. Stocksmeier (Berlin: International Society of Cardiology Scientific Council on Rehabilitation of Cardiac Patients, 1976), pp. 54-55.

<sup>2</sup>Herman K. Hellerstein and Ernest H. Friedman, "Sexual Activity and the Postcoronary Patient," Archives of Internal Medicine 125 (June 1970): 987-999.

<sup>3</sup>Herman K. Hellerstein, "Rehabilitation of the Postinfarction Patient," Hospital Practice 7 (July 1972): 45-53.

activity enhanced self-esteem. The frequency and quality of sexual intercourse were promoted by physical reconditioning programs.<sup>1</sup> Furthermore, the return to "pre-illness sexual function" appeared to be correlated with "feeling well". The onset of this "feeling well" period was somewhat related to the time post-infarction patients returned to work.<sup>2</sup>

Mulcahy reported the use of returning to work as an index of successful rehabilitation. In his work in Ireland, he reported that 76 percent of his coronary heart disease patients returned to work during the first one hundred days. The patients who delayed returning or failed to return to work offered primarily personal and psychosocial reasons rather than physiological reasons.<sup>3</sup> Mulcahy also reported, that coronary heart patients who

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<sup>1</sup>Herman K. Hellerstein and Ernest H. Friedman, "Sexual Activity and the Postcoronary Patient," Archives of Internal Medicine 125 (June 1970): 987-999; Herman K. Hellerstein, "Rehabilitation of the Postinfarction Patient," Hospital Practice 7 (July 1972): 45-53.

<sup>2</sup>United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750. Washington, D.C.: 1976], p. 16.

<sup>3</sup>R. Mulcahy, "The Rehabilitation of Patients with Coronary Heart Disease: A Clinician's View," in Psychological Approach to the Rehabilitation of Coronary Patients, ed.

died had a significantly higher ( $p < 0.01$ ) cigarette smoking experience compared with survivors. In linking this statistic with rehabilitation, he suggested that early return to work and reducing daily cigarette usage may be another worthwhile approach to cardiac rehabilitation.<sup>1</sup>

Further evidence for psychosocial reasons as disabling factors was also provided.<sup>2</sup> They studied twenty-four convalescing post-infarction patients. Their conclusions concurred with those of Wynn.<sup>3</sup> Thus, it was further substantiated that potentially preventable psychosocial factors unnecessarily restrained patients from resuming the life style of their previous lives.

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U. Stocksmeier (Berlin: International Society of Cardiology Scientific Council on Rehabilitation of Cardiac Patients, 1976), pp. 54-55.

<sup>1</sup>Ibid., p. 58.

<sup>2</sup>H.A. Wishnie, T. P. Hackett, and N. H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction," Journal of the American Medical Association 215 (February 22, 1971): 1292-1296.

<sup>3</sup>Allan Wynn, "Unwarranted Emotional Distress in Men with Ischaemic Heart Disease (IHD)," The Medical Journal of Australia (November 4, 1967): 847-851.



The most accurate determinant of a patient's return to work was found to be his perception of his own health status.<sup>1</sup> This self perception of health status while somewhat correlated with a clinical assessment of health status, was independent and real to the patient.<sup>2</sup>

Cook also stressed the importance of the patient's own perceptions of himself and his capabilities after the heart attack. She labeled "a person's total view of himself and his appraisal of what he sees" as his "self-concept"<sup>3</sup> and suggested that ward nursing intervention should be aimed at developing a patient's healthy attitude toward himself and his illness.<sup>4</sup>

She explained that this perspective could be achieved by promoting the patient's improvements in his self care coupled with explicit individualized medical advice on life style adjustments. The projected results would be the maintenance of the patient's healthy self-concept, a reduction of unnecessary fears, and greater opportunities for successful cardiac rehabilitation.<sup>5</sup>

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<sup>1</sup>Thomas F. Garrity, "Morbidity, Mortality, and Rehabilitation," in Psychological Aspects of Myocardial Infarction and Coronary Care, eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company., 1975), pp. 131-132.

<sup>2</sup>Ibid.

<sup>3</sup>Carroll I. Cook, "Self Concept of the Myocardial Infarction Patientk" The Canadian Nurse 72 (October 1976): 37.

<sup>4</sup>Ibid., p. 38.

<sup>5</sup>Ibid.

In summary, this literature review revealed the prominent place psychosocial factors can play in different indices of successful cardiac rehabilitation. Two primary indices--return to one's role within the family, and return to work where the more frequently utilized indices. A more recent emphasis in measuring successful cardiac rehabilitation may be self-assessment by the patient himself.<sup>1</sup>

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<sup>1</sup>Thomas F. Garrity, "Morbidity, Mortality, and Rehabilitation," in Psychological Aspects of Myocardial Infarction and Coronary Care, eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company, 1975), pp. 131-132; Carroll I. Cook, "Self-Concept of the Myocardial Infarction Patient," The Canadian Nurse 72 (October 1976): 37-38.

## CHAPTER III

### METHODOLOGY

#### Introduction

The purpose of this study was to determine the effects of a medically supervised group exercise program on the self-concept and life style of cardiac patients, more specifically, the program at the Dallas Cardiac Institute (hereafter referred to as DCI). The time period for this study was November 4, 1977 through June 13, 1978.

This chapter describes the methodology employed in studying the two groups of cardiac patients who were the subjects of this study. The following categories were identified and represent the major aspects of the study: (1) preliminary procedures, (2) pilot study, (3) selection and description of the instruments, (4) selection of subjects, (5) collection of data, and (6) treatment of data.

#### Preliminary Procedures

The DCI is one of the largest exercise therapy centers for cardiac patients in the nation. Originally, the site of the exercise therapy was the Town North Young

Men's Christian Association (4332 Northhaven) in Dallas, Texas. However, the increase in patient enrollment has led to the addition of another site at the Dedman Center on the campus of Southern Methodist University also in Dallas, Texas.

Since its inception in September, 1973, the DCI has maintained a medically supervised group exercise program. This six-days-per-week program consists of routine physiological measurements monitored by an exercise physiologist and supervised by attending cardiologists. Overall management of this program is governed by a board of trustees composed of physicians and laymen.

One of the trustees, Dr. Perry E. Gross, a family practitioner by training, had, on various occasions, observed obvious improvements in patients' outlook on life after admission to the medically supervised group program. Dr. Gross suspected that, in addition to cardiovascular restoration, other benefits were also accruing to patients. He became interested in validating these operations by determining the impact of the DCI exercise regimen. Particular influences of the regimen on the self-image and life style of post-infarction patients were suggested. However, to date, no study has been conducted to assess patients' psychosocial changes that included self-concept and life style factors.

Dr. Gross thus approached Dr. Donald Merki, Department of Health Education of the Texas Woman's University, for assistance in a general study of the DCI program. Dr. Merki subsequently asked this investigator if he would be interested in such a study.

Consequently, on March 31, 1977, the investigator met with Drs. Gross and Merki and discussed the program at the DCI. The idea of studying the effectiveness of the program in a research framework was the major topic of this meeting. As a result, it was decided that a study would be initiated. The focus of this study would be an examination of the influence of the DCI program on self-concept and life style factors of male cardiac patients.

The recognized need to identify the impact of a medically supervised group exercise program on self-concept and life style factors among exercising cardiac patients made the DCI a very conducive setting for research. For example, several advantages were present:

1. the DCI staff were very cooperative and eager to assist in a study of the Institute program's effects on self-concept and other psychosocial variables
2. a large pool of potential subjects was also readily accessible

3. opportunities for studying a large pool of exercising cardiac patients elsewhere would be limited

Thus the need for the study was identified and the research setting was surveyed. A review of the literature was then initiated on the self-concept and life style factors as they affected cardiac patients. Concurrently, a search was started for suitable instrumentation to measure self-concept and life style factors among cardiac patients.

The entire design, including a preliminary review of the literature, tentative selection of instrumentation, and planned procedures for an investigation of exercising cardiac patients were embodied in an institutional research grant proposal. This proposal was submitted to the Texas Woman's University for funding in May, 1977. It was entitled, "The Effects of a Medically Supervised Exercise Program on the Self-Concept of Post-Infarct Patients" and is included in its entirety as Appendix B. During the summer of 1977, this institutional research grant proposal was approved by the Texas Woman's University. Funding from this grant partially financed the pilot study and later the actual investigation.

### Pilot Study

A pilot study was deemed necessary because no previous study had been conducted with the chosen instrumentation. This pilot study was conducted during the fall of 1977. Subjects for this study were drawn from cardiac patients being treated by Dr. Boots Cooper, a cardiologist associated with Westgate Hospital in Denton, Texas.

The objectives of the pilot study were the following: (1) to conduct a trial run of previously untested instrumentation (Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale) on cardiac patients; and (2) to refine data recording procedures for use with the computer. Both objectives were achieved.

The pilot study revealed that cardiac patients were willing to respond to the instrumentation. Data entry and recording procedures were made compatible with the computer package, the Statistical Package for the Social Sciences (hereafter referred to as SPSS).

The successful completion of the pilot study paved the way for the actual investigation of the DCI program. Written approval to conduct the study was secured and a copy of this letter of approval is enclosed as Appendix C.

The culmination of the preliminary procedures involved the development of the prospectus. This prospectus was approved by the dissertation committee and filed in the Office of the Graduate Dean at the Texas Woman's University in Denton, Texas.

### Selection and Description of the Instruments

It was necessary to find suitable instrumentation to quantify an intangible characteristic such as self-concept and other similar factors such as life style. Furthermore, the instrumentation had to be reliable, and relevant to adult cardiac patients.

The literature was reviewed for rating scales to meet those needs. None of the sources in the review of literature revealed satisfactory evaluative instruments for the assessment of self-concept and life style factors that met all of the established criteria. These criteria were as follows:

<u>Criteria</u>	<u>Rationale or Implementation</u>
(1) the instrument must be specifically intended for adult cardiac patients;	to insure its appropriateness,
(2) the content of the items in the assessment of self-concept must reflect the patient's attitudes toward his past, present, and future self, the patient's relationships toward his family and	to insure content validity,



reveal his own assessments of his sex life and work life;

- (3) the content of items in the assessment of life style change factors must reflect the patient's attitudes or describe the patient's behaviors in areas that would probably be affected by abnormal cardiac conditions; to insure content validity,
- (4) the reliability of the instruments applied to this population must be greater than 0.70. actual overall reliability was 0.8167 for the Dallas Cardiac Self-Concept Scale and 0.8911 for the Life Style Change Factors Scale.

Hence, separate instruments were created: one for the assessment of self-concept, and another for the assessment of life style change factors. For both instruments, the semantic differential technique was chosen. This technique met all of the criteria listed above.

The semantic differential technique was used to formulate the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale. The Dallas Cardiac Self-Concept Scale (Appendix E) used to assess self-concept in cardiac patients is described first.

The Dallas Cardiac Self-Concept Scale was composed of eight facets of self-concept and a uniform set of thirteen scales of diametrically opposite words or phrases. The eight facets of self-concept selected for this study are listed as follows:

My Actual Self  
My Desired Self  
My Past Self  
My Present Self  
My Future Self  
My Family Life  
My Sex Life  
My Work Life

The thirteen scales of diametrically opposite words or phrases used consistently for measuring each of the previously mentioned facets of self-concept were as follows:

competent/incompetent  
meaningless/meaningful  
feeling whole/feeling damaged  
worthless/valuable  
happy/sad  
tense/relaxed  
potent/impotent  
negative/positive  
important/unimportant  
unsuccessful/successful  
good/bad  
sick/healthy  
contented/anxious

The sequence for these scales was randomized except in two instances. The first instance involved the scale, "contented/anxious" on the facet, "My Future Self". In this particular instance, the patient's response was added to their numerical score representing "My Future Self". The second exception involved a typographical error discovered in the placement of a word in the facet, "My Sex Life". Scoring procedures accomodating these manipulations are detailed in Appendix M, Part II.

The other instrument used, the Life Style Change Factors Scale, was developed to gather information about life style factors which reflected cardiac patients' behaviors in areas that were probably affected by abnormal cardiac conditions. These areas were determined to be the following: return to one's job, sleep, diet, sex life, parenting, one's role as a husband, one's leisure activities with his family, and interpersonal relationships. These particular factors were selected primarily on the basis of a review of the literature and personal communications.<sup>1</sup> The specific references associated with each of these life style factors are denoted next.

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<sup>1</sup>Donald J. Merki, Ph.D. and Perry E. Gross, M.D., 1977: personal communications.

Personal communications<sup>1</sup> accounted for inclusions of five life style factors on the Life Style Change Factors Scale. These five factors were as follows: return to one's job, sex life, one's effectiveness as a worker, one's leisure activities within his family, and interpersonal relationships. The remaining five life style factors included on the Life Style Change Factors Scale were delineated from the review of the literature. Two factors were explicitly delineated by the review of the literature. These two factors and their literature references were as follows: "sleep"<sup>2</sup> and "smoking"<sup>3</sup> The ~~three~~ other life style factors were implicitly derived from the review of the literature. Strongly suggestive support for

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<sup>1</sup>Ibid.

<sup>2</sup>John Naughton, John Bruhn, and Michael Lategola, "Effects of Physical Training on Physiological and Behavioral Characteristics of Cardiac Patients," Archives of Physical Medicine and Rehabilitation 49 (March 1968): 131-137; H. A. Wishnie, T. P. Hackett, and N. H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction," Journal of the American Medical Association 215 (February 22, 1971): 1292-1296.

<sup>3</sup>H. A. Wishnie, T. P. Hackett, and N. H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction," Journal of the American Medical Association 215 (February 22, 1971): 1292-1296.

their inclusion as life style factors significant to cardiac patients may be implied from the context of the references. It was in this manner that "parenting" was gleaned,<sup>1</sup> "one's cigarette smoking habits" was derived,<sup>2</sup> and "one's role as a husband" was considered.<sup>3</sup>

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<sup>1</sup>United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750, Washington, D. C.: 1976], pp. 55-56.

<sup>2</sup>H. A. Wishnie, T. P. Hackett, and N. H. Cassem, "Psychological Hazards of Convalescence Following Myocardial Infarction," Journal of the American Medical Association 215 (February 22, 1971): 1292-1296.

<sup>3</sup>Thomas F. Garrity, "Morbidity, Mortality, and Rehabilitation," in Psychological Aspects of Myocardial Infarction and Coronary Care, eds. W. Doyle Gentry and Redford B. Williams, Jr. (Saint Louis: The C. V. Mosby Company, 1975), pp. 124-133; N. Wagner, "Some Sexual Aspects of the Rehabilitation of Cardiac Patients," in Psychological Approach to the Rehabilitation of Coronary Patients, ed. U. Stocksmeier (Berlin: International Society of Cardiology Scientific Council on Rehabilitation of Cardiac Patients, 1976), pp. 118-128; United States Department of Health, Education, and Welfare, Needs and Opportunities for Rehabilitating the Coronary Heart Disease Patient: Report of the Task Force on Cardiovascular Rehabilitation of the National Heart and Lung Institute [Department of Health, Education, and Welfare Publication No. (NIH) 76-750, Washington, D. C.: 1976], pp. 56-57.

The relative importance of these life style factors to cardiac rehabilitation was evaluated by an expert jury. Evaluation by an expert jury was considered necessary because no hierarchy of these life style factors relating to their importance in cardiac rehabilitation was clear from the review of literature.

Membership on this jury was originally solicited from a list of persons from different parts of the nation who had written on the topic of cardiac rehabilitation, or who otherwise were acknowledged experts in cardiac rehabilitation. However, an insufficient response to invitations to join the expert jury forced a change in strategy.

On subsequent solicitations, individuals who were involved in cardiac rehabilitation or were experts in heart diseases or an expert in instrumentation were asked to join the jury. The final membership of this jury is listed in Appendix I.

The results of the expert jury's judgements were analyzed by a modification of the paired comparisons technique.<sup>1</sup> The composite opinion of the jury members indicated that no life style factor examined was more

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<sup>1</sup>J. P. Guilford, Psychometric Methods, (New York: McGraw-Hill Book Company, Inc., 1954), pp. 159-176; Warren S. Torgerson, Theory and Methods of Scaling (New York: John Wiley and Sons, Inc., 1958), pp. 166-173.

important than any other. Each life style factor played an equally important role in cardiac rehabilitation. A more detailed explanation of the expert jury's verdict appears in Appendix J.

### Selection of Subjects

The following steps were considered in the selection of the subjects for the study: (1) establishment of criteria for the selection of subjects, and (2) procedures followed in the assignment of subjects to groups.

#### Establishment of Criteria for the Selection of Subjects

The criteria established for the selection of subjects required that:

1. Subjects must be male cardiac outpatients. These individuals must have been diagnosed by a physician as having a heart condition such as angina pectoris, hypertension, myocardial infarction, open heart surgery, or the like, or any combination of the above such heart conditions
2. Subjects must have been referred to the medically supervised group exercise program of the DCI by their physicians

3. Subjects must be able and willing to participate in the study during the duration of this particular investigation (November 4, 1977, through June 13, 1978).

Procedures Followed in the Assignment  
Of Subjects to Groups

All study subjects in this investigation were male Caucasians, who had been referred to the DCI's medically supervised group exercise program by their physicians after a diagnosed cardiac abnormality. Prior to the actual investigation, each patient had decided for himself his membership into one of two groups. The differentiating factor between the two groups was whether or not patients participated in the DCI exercise regimen.

The group of patients who participated in the Dallas Cardiac Institute exercise program was designated as the experimental group. Out of approximately one hundred and fifty eligible subjects who were contacted, thirty-two men volunteered to participate in the study. The number of volunteers among eligible subjects was the decisive element in determining sample size.

Volunteerism was even more critical in determining the sample size of the other group of study patients. This group consisted of patients who did not participate in the DCI exercise program and was designated as the control group. Out of a potential pool of thirty-nine eligible



subjects for this group, twenty men consented to participate in this study. Unfortunately, though, one control group member who participated in the first assessment, died before the final assessment. The reason for his death could not be determined. The final outcome was that nineteen men constituted the control group.

Thus, in spite of attempts at maximal participation from both the experimental group eligibles, the total number of patients who participated in the study was fifty-one. It would have been much more desirable for sixty patients (thirty patients each from the two groups) to participate in the study. However, the operational constraints imposed by patient volunteerism resulted in this acceptable, though less than desirable sampling size.

#### Collection of Data

The first formal contact with patients in the experimental group was at the regularly scheduled exercise session of the DCI on November 4, 1977. At this session, the investigator and the study were introduced. All exercising cardiac patients were invited to join the study. Patients who were willing to participate were asked to complete the evaluative instruments (Appendix E and Appendix F) and return them the next time they returned to the exercise site.

Very few patients returned completed questionnaires the next day or the next time they returned to the exercise site. It was unclear why the initial response rate was low.

Reminders by DCI staff yielded returns of questionnaires in some cases. In many cases, persistent, but low-key prodding was necessary to encourage return of the questionnaires. The result was a staggered rate of response from the thirty-two members of the experimental group. As a consequence, the first administration of the evaluative instruments lasted from November, 1977, through February, 1978. The first administration was designated as the first assessment.

The time lapse between entry into the DCI program and the first assessment was considered a threat to the internal validity of the study. The degree of this threat needed to be examined. The evidence ruling out history and maturation of experimental group patients as rival explanations to any differences between the tested groups is provided in Appendix O.

The first assessment within the control group also lasted from November, 1977, through February, 1978. Since there was no single meeting place for all thirty-seven eligible members of the control group, this group was sent

the instruments by mail. An explanation of the study along with consent forms (Appendix D) and a stamped, addressed envelope were provided.

As with the experimental group, the initial response rate to the questionnaire was also low. Lack of response was followed-up by other mailings and telephone calls, if warranted. In some cases, delay in obtaining return of the questionnaires could be accounted for because of incorrect mailing addresses provided. In other cases, patients' inertia to response had to be overcome. In all cases, extensive effort was made to encourage maximal participation among control group eligibles. Despite repeated attempts, only nineteen patients composed the final control group membership.

The approximate interval of three to six months from the first collection was the indicator for collecting data for the final assessment. Experimental and control group members who returned instruments during the first assessment were asked to complete the same instruments for the final assessment. Experimental group patients were contacted by the investigator or DCI staff members at the exercise site. In rare instances, contacts were made by mail. For experimental group patients who failed to respond, follow-up included personal verbal requests and

telephone calls as needed. For control group patients who failed to respond, follow-up included additional mailings and telephone calls as needed. The final assessment that began in February, 1978, was concluded on June 13, 1978.

### Treatment of Data

In accordance with the nonequivalent control group design, analyses of covariance were considered to be appropriate for determining whether significant differences existed between the experimental and control groups.<sup>1</sup> This statistical treatment was preferred over simple gain scores<sup>2</sup> because analyses of covariance would reduce variations in the dependent variables due to the covariates. The ultimate result would be an increase in precision of the assessments.<sup>3</sup>

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<sup>1</sup>Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally College Publishing Company, 1963), pp 47-50.

<sup>2</sup>Ibid., p. 49.

<sup>3</sup>Jae-On Kim and Frank J. Kohout, "Analysis of Variance and Covariance: Subprograms ANOVA and ONEWAY", in Statistical Package for the Social Sciences, eds, Nie et al. (New York: McGraw Hill Book Company, 1975), p. 409.

Performance of the analyses of covariance necessitated proper preparation of the raw data. First the raw data were converted to computer-compatible formats (Appendix M, Part I). Computer-assisted scoring of items required that responses be translated to number. Both the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale were formulated with this in mind.

Secondly, the raw data were recoded and computed as needed to derive means and ranges for each of the facets of self-concept and each of the life style change factors (Appendix M, Part II). This was accomplished by keypunching the data into IBM cards and recoding as necessary. Data were converted to composite self-concept facet and composite life style factors for each patient. In other words, scores on corresponding scales were added to comprise a patient's total score corresponding to their respective facets of self-concept. Similarly, scores on corresponding scales were added to comprise a patient's total score corresponding to their respective life style factors.

Finally, separate analyses of covariance were performed on each facet of self-concept and on each life style factor. The resulting  $F$  ratios of the treatment to the residual were compared with the .05 alpha level for the

numerator and denominator degrees of freedom. The degrees of freedom for the numerator was one and the degrees of freedom for the denominator varied between forty-four and forty-eight.

The degrees of freedom for the numerator was the same ( $df = 1$ ) because two groups, the experimental and the control groups, were tested. The degrees of freedom for the denominator changed with the number of patients who responded to particular items on the Life Style Change Factors Scale. These particular items were the factors, "parent" and "husband". Omission of responses to these items were assumed to indicate that neither answer was appropriate. In these cases, the scores of "non-parents" or "non-husbands" were not included in the calculation of scores for "parent" and "husband", respectively. In all other calculations, all fifty-one patients' scores were included to generate the statistics of this study.

All data manipulations and statistics in this study were performed by the Statistical Package for the Social Sciences (SPSS). The investigator chose this series of computer programs for three reasons. First, a primary reason for the selection of the SPSS was the influence of a Texas Tech University faculty member, Dr. Edward Burkhardt. Dr. Burkhardt created the first set of

computer instructions for this investigation and generously shared his expertise of the SPSS with this investigator. A second reason for choosing the SPSS was the ease in using this particular series of computer programs. The third reason for deciding on the SPSS was its accessibility at both computing facilities of Texas Tech University and the North Texas State University where data would be analyzed.

Data analysis with the SPSS involved three major steps: (1) the raw data were recorded, (2) computations were performed on the data, and (3) analyses of covariance were derived. These steps are further explained in succeeding paragraphs.

First, the raw data were keypunched according to the prescribed numerical code (Appendix M, Part I). Three IBM cards were needed for every patient to accommodate the data gathered during each assessment.

Computation of means and ranges as outcomes of the second major step required several intervening procedures. Initially, the keypunched data cards were entered into the computer and transformed into recoded and summed values. The output was in the form of a newly created set of IBM cards, one of the advantageous features of the SPSS. This new set of data cards served as the basis for all subsequent SPSS operations.

Instructions for the SPSS subprogram, FREQUENCIES (Appendix M, Part III), directed this new data deck to compute and print means, ranges, and histograms for each facet of self-concept and each life style factor. The output from FREQUENCIES was summarized in Appendix L and concluded the second major step of data manipulations.

The final task for the newly created data decks was to perform the analyses of covariance. Analyses of covariance in this investigation were invoked by instructions for implementing the SPSS subprogram, ANOVA (Appendix M, Part IV). In this sub-program, data decks from both the experimental and control groups for both the first and second assessments were simultaneously entered as a single data deck into the computer. The first ANOVA computer run generated analyses of covariance for all facets of self-concept and all life style factors except for "parent" and "husband". Separate ANOVA runs with consideration for the varying numbers of responding patients generated analyses of covariance for "parent" and "husband", respectively.



### Summary

In Chapter III the methodology employed in this investigation was described. The description of this methodology was amplified under the following headings: (1) preliminary procedures, (2) pilot study, (3) selection and description of the instruments, (4) selection of subjects, (5) collection of data, and (6) treatment of data. Chapter IV follows with the results of the study.

## CHAPTER IV

### RESULTS OF THE STUDY

The purpose of this study was to determine the effectiveness of a medically supervised group exercise program on the self-concept and life style of cardiac patients. The purpose of this chapter is to present the results of the study in narrative and tabular forms. These results will be presented in the following order: (1) description of the groups in the study, (2) performance of the groups on the testing instruments, and (3) differences between the groups.

#### Description of the Groups in the Study

All subjects were male, Caucasian, cardiac patients who voluntarily participated in this study. In the control group, the patients' ages varied from 31 to 69 with a mean of 50.5 (four patients' ages were unknown). In the experimental group the patients' ages varied from 36 to 69 with a mean of 53.9. The age differences between the control and experimental groups were not significant at an alpha of .05. The age distribution of patients is shown in detail on the next page in Table 3.

TABLE 3

Age Distribution of Cardiac Patients  
(by groups)

<u>Ages</u>	<u>Control</u>	<u>Experimental</u>
31-49	26% (n = 5)	40% (n = 13)
50-59	42% (n = 8)	38% (n = 12)
60-69	11% (n = 2)	22% (n = 7)
Unknown	21% (n = 4)	-----
	100% (n = 19)	100% (n = 32)

In Table 4 the initial diagnosis of cardiac patients who released their medical records for this study is presented. The most frequent diagnoses in both groups were myocardial infarctions. The second and third most frequent diagnoses, chest pains and cardiac bypass surgery, may have been the consequences of myocardial infarctions.

Performance of the Groups on the  
Testing Instruments

Self-concept and life style factors were assessed in this study by two instruments, the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale. Both instruments were administered twice to both the experimental and the control groups.

TABLE 4  
Initial Diagnosis of Cardiac Subjects  
(by groups)

<u>Diagnosis</u>	<u>Control</u>	<u>Experimental</u>
Myocardial infarction	10	15
Chest pain or discomfort	2	8
Cardiac surgery (e.g. bypass)	1	6
Ventricular arrhythmia	1	0
Other	0	2
Not reported or no consent given*	5	1
	<u>n = 19</u>	<u>n = 32</u>

\*Authorization for the release of medical records for reporting in this investigation was not granted by the cardiac patients involved.

The threats to internal validity created by a time lapse between entry in the DCI program and participation in this study were examined. See Appendix O.

The first administration of the testing instruments was considered as a "pre-test" measure. In the subsequent analyses of covariance, these "pre-test" measures were considered the covariates. The statistics generated on the administration of the testing instruments are recorded in Tables 5 and 7.

The second or final administration of the testing instruments was conducted approximately three to six months after the initial assessment. Scores on the second administration constituted the dependent variables on the subsequent analyses of covariance. The statistics generated during the second administration of the testing instruments are recorded in Tables 6 and 8.

Measures of Variability and Central Tendency from Scores on the  
Dallas Cardiac Self-Concept Scale for Cardiac Patients

(by groups)

TABLE 5

First Measurement

Control Experimental

Facet	MPS*	Range	Mean	Range	Mean
My Actual Self	91	49.0	70.0	51.0	74.2
My Desired Self	91	68.0	82.2	42.0	84.2
My Past Self	91	83.0	61.5	91.0	72.3
My Present Self	91	60.0	68.3	61.0	73.0
My Future Self	91	91.0	80.1	42.0	83.9
My Family Life	91	64.0	68.1	78.0	72.5
My Sex Life	84	84.0	51.2	69.0	64.2
My Work Life	91	67.0	67.0	77.0	69.7

TABLE 6

Second Measurement

Control Experimental

Facet	MPS*	Range	Mean	Range	Mean
My Actual Self	91	62.0	68.3	91.0	72.3
My Desired Self	91	17.0	86.3	43.0	81.9
My Past Self	91	47.0	70.1	91.0	70.3
My Present Self	91	47.0	67.8	61.0	73.4
My Future Self	91	24.0	85.5	91.0	79.7
My Family Life	91	55.0	68.9	59.0	76.1
My Sex Life	84	60.0	61.8	84.0	64.6
My Work Life	91	90.0	67.2	91.0	71.8

\*MPS = maximum possible score

Measures of Variability and Central Tendency from Scores on the  
Life Style Change Factors Scale for Cardiac Patients

(by groups)

TABLE 7

First Measurement

Factor	MPS*	Control		Experimental	
		Range	Mean	Range	Mean
Return to Job	10	10.0	5.5	9.0	7.1
Sleep	14	10.0	10.6	11.0	10.3
Diet	7	5.0	4.8	5.0	5.9
Sex Life	28	21.0	15.5	26.0	18.9
Parent**	21	21.0	15.6	9.0	18.1
Husband***	28	18.0	20.1	20.0	23.5
Smoking	14	9.0	9.7	7.0	12.3
Worker	14	14.0	10.1	14.0	11.1
Recreation	14	12.0	7.8	12.0	9.6
Relationships	14	12.0	10.3	10.0	10.4

TABLE 8

Second Measurement

Factor	MPS*	Control		Experimental	
		Range	Mean	Range	Mean
Return to Job	10	9.0	6.2	9.0	7.4
Sleep	14	11.0	10.6	8.0	11.1
Diet	7	4.0	5.2	7.0	5.1
Sex Life	28	21.0	17.8	21.0	19.6
Parent**	21	10.0	18.1	21.0	18.1
Husband***	28	16.0	19.8	28.0	23.2
Smoking	14	7.0	12.1	14.0	10.9
Worker	14	14.0	9.3	14.0	9.9
Recreation	14	11.0	8.6	14.0	9.9
Relationships	14	11.0	10.8	14.0	9.8

\*MPS - maximum possible score

\*\*The scores of one control group patient (ID = 548) and one experimental groups patient (ID = 045) who were not parents were deleted in these statistics.

\*\*\*The scores of one control group patient (ID = 548) and one experimental group patient (ID = 032) who were not husbands were deleted in these statistics.

### Differences Between the Groups

Data analyses to determine statistical differences between the experimental and the control groups were accomplished by analyses of covariance for each facet of self-concept and each life style factor. The 0.05 alpha level was chosen to indicate significance. At this level no significant differences between the control and the experimental groups were observed. The F ratios and significance levels of the F ratios are indicated in Table 9 and Table 10.

TABLE 9

Results of Statistical Analyses of Covariance  
for Self-Concept Scores of Cardiac Patients\*

Dallas Cardiac Self- Concept Scale	F Ratio	Significance Value of F Ratio
My Actual Self	0.74	0.40
My Desired Self	2.52	0.12
My Past Self	0.03	0.87
My Present Self	0.59	0.45
My Future Self	2.05	0.16
My Family Life	1.86	0.18
My Sex Life	0.14	0.71
My Work Life	0.30	0.59

\*Individual zero scores were also included in these analyses of covariance.



TABLE 10

Results of Statistical Analyses of Covariance for  
Life Style Factor Scores of Cardiac Patients\*\*\*

Life Style Change Factors Scale	F Ratio	Significance Value of F Ratio
Return to Job	0.11	0.75
Sleep	0.74	0.39
Diet	2.66	0.11
Sex Life	0.08	0.78
Parent*	0.54	0.47
Husband**	0.40	0.53
Smoking	2.15	0.15
Worker	3.10	0.13
Recreation	0.44	0.51
Relationships	1.32	0.26

\*The scores of one control group patient (ID = 548) and one experimental group patient (ID = 045) who were not parents were deleted in these statistics.

\*\*The scores of one control group patient (ID = 548) and one experimental group patient (ID = 032) who were not husbands were deleted in these statistics.

\*\*\*Individual zero scores were also included in these analyses of covariance.

Summary

In Chapter IV the results of the study were presented. The results were presented in terms of (1) description of the groups in the study, (2) performance of the groups on the testing instruments, and (3) differences between the groups. Chapter V follows with the discussion of the results, summary, conclusions, and recommendations for future study.

## CHAPTER V

### SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE STUDY

This chapter includes a summary of the research design and protocol, its findings, a discussion of the results, and conclusions. Recommendations for future studies are also included.

#### Summary of the Research Design and Protocol

The first awareness of a need for this study came from Dr. Perry Gross, a family practitioner and trustee of the Dallas Cardiac Institute (DCI). He had suspected that the improved self-concepts and life style changes he observed among exercising cardiac patients were at least partially due to enrollment and participation in the DCI's medically supervised group exercise program. However, definitive evidence had not been gathered and no previous study had been conducted to examine the effects of a medically supervised group exercise program in the self-concept and life style of cardiac patients.

Dr. Gross thus approached Dr. Donald Merki, of the Texas Woman's University's Department of Health Education

for assistance in a general study of the effectiveness of the DCI's program. Dr. Merki subsequently asked this investigator if he were interested in pursuing Dr. Gross's request as a possible dissertation topic. This investigator eagerly accepted this invitation to conduct a study of the DCI.

After discussions with Drs. Gross and Merki, the investigator surveyed the literature and wrote a research proposal. The proposal was submitted to the Texas Woman's University for funding, which was subsequently approved. The basic research question of this proposal was implied in the title of the institutional proposal as "The Effects of a Medically Supervised Exercise Program on the Self-Concept of Post-Infarct Patient" (Appendix B). After several refinements, the question was identified as "What are the effects of a medically supervised group exercise program on the self-concept and life style of male cardiac patients?"

Assessment of self-concept and life style factors was achieved by developing scales (named the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale, Appendices D and E) especially created by this investigator for this study. This development was necessitated by the

lack of satisfactory evaluative instruments to measure self-concept and life style factors among adult cardiac patients in the research literature.

The content for these instruments was derived primarily through consultations with Drs. Gross and Merki and from a review of literature on the self-concept and psychosocial aspects of cardiac patients. The outcome of these consultations, the review of literature, and this investigator's judgment resulted in the identification of eight facets of self-concept and ten life style factors. (An invited expert jury's verdict was that no hierarchy involving the relative importance of life style factors could be established. See Appendix J). These eight facets of self-concept and ten life style factors comprised the basis of the evaluative instruments developed (Appendices D and E). These instruments were then pilot tested on cardiac patients not involved with the DCI.

After the pilot study in which instrumentation was tested and data entry procedures for computerization were refined, the actual investigation began. The research scheme involved the nonequivalent group design. This design was dictated because selection factors beyond the

control of the investigator governed the natural division of cardiac patients prescribed the DCI into two groups.<sup>1</sup>

One group consisted of thirty-two cardiac patients who exercised in the DCI medically supervised group exercise program. This group was designated as the experimental group.

Threats to the internal validity of the study posed by the time lapse between the experimental group patient's entry into the DCI treatment program and the date he consented to join this investigation were measured by the Spearman Rank Correlation Technique. The Spearman Rank Correlation Technique was chosen because no true pre-measure was available to test the great majority of patients on self-concept and life style factors when they first enrolled in the DCI program. The use of the Spearman Rank Correlation Technique enabled the investigator to compare patients' days in the DCI program prior to the first assessment with their scores on the first assessment. Data analysis from this nonparametric statistical procedure effectively ruled out time in the program prior to the first assessment as a rival explanation to differences between the tested groups.

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<sup>1</sup>Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research, (Chicago: Rand McNally College Publishing Company, 1963), pp. 47-50.

The other group consisted of nineteen cardiac patients who had been referred to the DCI by their physicians but who did not participate in its medically supervised group exercise program. This latter group was designated as the control group.

Evidence of the effectiveness of the medically supervised group exercise program on self-concept and life style factors was sought by comparing experimental group mean scores with control group mean scores. The methods chosen to compare the scores of these two groups were performing analyses of covariance. Consequently, mean scores of the experimental group and the control group were required on two assessments.

The first assessment was administered between November 4, 1977, and February, 1978. During this period, the patients' (both the experimental and control groups) facets of self-concept and life style factors were assessed for the first time. This first assessment yielded the covariates. Data from the covariates were stored until data collection from the second assessment was completed.

The second assessment was administered between February, 1978, and June 13, 1978. During this period, the patients' facets of self-concept and life style factors were assessed for the second time. This second assessment

yielded the dependent variables. Analyses of covariance were performed on the covariates and dependent variables to test the null hypotheses. A statement of the null hypotheses of the study follows.

### Tests of the Hypotheses

The following null hypotheses were postulated and tested at the .05 level of confidence:

Accepted: There is no significant difference between the experimental group and the control group with respect to each facet of self-concept as measured by the Dallas Cardiac Self-Concept Scale.

Accepted: There is no significant difference between the experimental group and the control group with respect to each factor of life style change factors as measured by the Life Style Change Factors Scale.

### Summary of the Findings

Findings showed that mean scores of the experimental group were not significantly different than mean scores of the control group with respect to any facet of self-concept or any life style factor assessed at the .05 alpha level.



### Discussion of the Results

The findings of no statistical difference between the experimental group and the control groups were contrary to the investigator's expectations. The expectations had been that significant differences should have been observed.

The reasons for expecting significant differences between the experimental and control groups were both objective and subjective. Objectively, a review of the literature pointed toward definitive differences in favor of exercising cardiac patients over non-exercising cardiac patients for psychological measures.<sup>1</sup> Subjectively, the DCI staff's observations of exercising cardiac patients' progress in physical fitness probably led to interpretations that progress in psychosocial areas should have likewise been accomplished. The investigator shared this same reasoning. (No observations of the non-exercising control group were conducted). When it appeared that

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<sup>1</sup>B. D. McPherson et al., "Psychological Effects of an Exercise Program for Post-Infarct and Normal Adult Men," Journal of Sports Medicine and Physical Fitness 7 (June 1967): 95-101; John Naughton, John Bruhn, and Michael Lategola, "Effects of Physical Training on Physiological and Behavioral Characteristics of Cardiac Patients," Archives of Physical Medicine and Rehabilitation 49 (March 1968): 131-137.

study results and expectations did not coincide, other explanations for the data were sought.

For example, threats to the internal validity of the study were examined. Specifically, the concern was that the length of time prior to the first assessment might promote history and maturation of patients as rival explanations to any differences between the tested groups. A determination of the possible relationships of patients' duration of treatment in the DCI program and their individual scores on all facets of self-concept and life style factors was conducted with the Spearman Rank Correlation Technique. For this nonparametric statistical procedure, the experimental group patients' ranks in terms of days between entry into the DCI treatment program and the date they signed their consent form were compared with the ranks of their scores on all variables. The highest correlation on all variables between time and scores was 0.3719. The mean correlation on all variables between time and scores was .09316, indicating a low overall positive relationship. Thus, the rival explanations of history and maturation of patients as threatening the internal validity of the study could probably be minimized (See Appendix O for a detailed description of the application of the Spearman Rank Correlation Technique in this study).

Various explanations could be cited for this phenomena of no significance between the experimental and control groups. Among these, were those involving statistical interpretations and instrumentation inadequacies to more complex reasons involving uncontrolled and intangible human variables. The discussion that follows attempts to include the majority of likely explanations.

First, the observations of no differences could be interpreted statistically as Type II errors. In other words, the risks existed of accepting the null hypotheses when, in fact, they should have been rejected. Justifications for the occurrences of Type II errors may be argued by the discovery of the low overall mean power (0.35) for the analyses of covariance. The overall Type II error rate was therefore 0.65 (Type II error rate,  $\beta = 1 - \text{power}$ ). (See Appendix N for details).

The relatively low overall power in this study inferred that a priori possibilities of rejecting the null hypotheses were low.<sup>1</sup> Thus, the failure to reject the null hypotheses cannot signify proof for the actual existence of no differences between the experimental and the control

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<sup>1</sup>Jacob Cohen, Statistical Power Analysis for the Behavioral Sciences (New York: Academic Press, Inc., 1969), p. 4.

groups. On the other hand, low power signified that the number of subjects was probably less than needed to formulate conclusive results.

The small number of subjects in the study ( $N = 51$ ), particularly in the control group ( $N = 19$ ) was certainly a shortcoming. The variable of subject volunteerism was not under the control of the investigator and presumably had the greatest influence on the outcome of the study. In the case of the control group, much effort was exerted in encouraging participation. However, the maximum subject (patient) pool at the outset of the study was thirty-seven. These thirty-seven patients were the only ones who were qualified to become control group members because they did not participate in the DCI medically supervised group exercise program. The final number of nineteen consenting participants in the study was equivalent to approximately 50 percent of the potentially eligible, living subjects. On a percentage basis, this figure was considered unusually high and very representative of the control group.

In the case of the experimental group, the variable of subject (patient) volunteerism was apparently modulated by the larger response ( $N = 32$ ). The greater probability

for variability in the experimental group was possible because of the larger potential pool of eligible patients (approximately 150).

Other interpretations for the observed lack of significant differences between the experimental and control groups involved instrumentation inadequacies and study population characteristics. Both the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors were self-reporting instruments. As a result, responses were dependent upon the study population's cooperation. Whether the experimental group and the control group differed significantly in their cooperation was not assessed. However, intangible differences between these two groups may be inferred.

Subjective support for some differences between exercising (experimental group) and non-exercising (control group) patients was provided by DCI staff observations and experimental group patients' comments. DCI staff have witnessed tremendous psychological differences very soon after postrecovery cardiac patients actively began to engage in the medically supervised group exercise program. Besides the exhilarating effects of exercise itself, there was a certain, noticeable sense of camaraderie

that existed among exercising cardiac patients. Social intercourse was free and friendly among patients and staff.

After joining the DCI program, exercising cardiac patients themselves testified to their feeling better. There was speculation that this sense of physiological rejuvenation enhanced patients' self-esteem and self-confidence that might have affected life style changes. Some evidence in this direction came when it was observed that a few of the patients' spouses or children joined the male cardiac patient in jogging around the gymnasium.

Within the experimental group, at least one cardiac patient described himself as physically uncomfortable or sluggish if he missed too many exercise sessions. Other patients probably felt the same way. Thus, the behaviors and oral testimonies of cardiac patients seemed to indicate definite changes occurring among exercising cardiac patients.

Conversely, representativeness and response patterns among the non-exercising cardiac patients or control group were susceptible to very influential selection factors. First, as alluded to previously, only nineteen out of a possible thirty-seven control group eligibles completed and returned the testing instruments. Second, there is reason to believe the control group members who

responded were probably very heterogeneous and different from the non-responding control group eligibles. Several pieces of evidence could be construed to describe the actual constitution of the nineteen control group respondents. Two patterns emerged.

On the one hand, the nineteen control group patients who responded were healthy enough to respond to the instrumentation. This fact seemed trivial. However, in the light of discovering that three out of six deaths among control group eligibles could be traced to a cardiac cause, this finding appeared to be important. Overall study results might have been significantly altered had these three cardiac fatalities, the suicide case (Appendix K), and others who were unable or unwilling to participate because of physical or mental impairments been included.

To the degree that the deceased and the disabled were excluded, it was believed that the volunteer group respondents were the more healthy survivors who perhaps also possessed better self-concepts among this non-exercising cardiac population. Additionally, they might be characterized as "non-compliers". In other words, though these nineteen control group respondents had been prescribed the DCI medically supervised group exercise program by their physicians, they decided not to participate. These

nineteen men failed to comply with medical advice and decided to persist on their own power. Their responses to the instrumentation and research under the auspices of the DCI may have been veiled attempts to assert and prove their independence and vitality without regimented treatment.

Support for very interesting attributes ascribed to "non-compliers" with such organized programs as the one at the DCI have been reported by Levine. According to Levine, "non-compliers" have been noted to recover in shorter periods of time. They have been depicted as being "active and angry in their own interest".<sup>1</sup> Consequently, the "non-compliers" possessed the propensity to survive the longest and resisted institutionalization. In the opinion of the investigator, apparently they craved independence and self-reliance. They did not want to be in a "cuckoo's nest", whether that "nest" be a mental institution or a nursing home or possibly a regimented group exercise program like that of the DCI. In essence, the nineteen control group respondents appeared to be the "cream of the crop", i.e. the physically and psychologically more healthy representatives of the non-exercising cardiac population.

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<sup>1</sup>Lowell S. Levine, Ed.D., M.P.H., Associate Professor of Public Health (Health Education), Yale University: personal communication, 1978.



Another parameter for comparing the experimental and control groups was age. As noted in the description of groups (page 60), the means of both groups were in their fifties. In their fifties, men's self-concept and life style have essentially been determined. Thus, age could have been such a dominating influence that regardless of the type of treatment (including the DCI program), the self-concepts and life styles of both groups of patients would not be significantly altered. In summary, the discussion of the results cited various possible explanations for the lack of significant differences between the experimental and the control groups.

Age was mentioned as a partial explanation for the statistical similarity of the groups. Other partial explanations discussed in this section included Levine's "non-compliant" patient hypothesis, statistical interpretations, instrumentation inadequacies, and the differing extent of cooperation in the experimental and control groups.

### Conclusions

It seems that participation in a medically supervised group exercise program as described in this study did not affect the self-concept and life style factors of male cardiac outpatients when compared with a control group.

Recommendations

As a result of the current study, the investigator recommends the following for continued research:

1. A search for instrumentation having proven validity and reliability in assessing self-concept and life style factors relevant for adult cardiac patients
2. A series of extended interviews with the non-exercising cardiac patients (control group members) to further determine self-concept or life style factors accounting for their health
3. A longitudinal study to chronologically trace self-concept and life style factor changes that would include progressive sampling of a study population from men having high risks to cardiac disorders before hospitalization, hospitalized male cardiac patients, and male cardiac outpatients.<sup>1</sup>
4. A longitudinal comparative study based on certificates of death or medical records to determine whether an association exists between casuation of death and exercise frequency and vigor after a cardiac abnormality

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<sup>1</sup>This recommendation was adapted from Michael Dehn's suggestion. (Mr. Dehn is the Secretary-Treasurer of the DCI Board of Trustees).

A P P E N D I X

APPENDIX A  
LETTER APPROVING RESEARCH FROM THE  
HUMAN RESEARCH COMMITTEE

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of Investigator: Moon S. Chen, Jr. Center: Denton

Address: Dept. of Health, P.E. & Recreation Date: 9-9-77

Texas Tech University

P.O. Box 4070

Lubbock, Texas 79409

Dear Mr. Chen:

Your study entitled The Effects of a Medically Supervised Group Exercise Program on the Self Concept and Life Style of Cardiac Patients has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,

*C. K. Rozier*

Chairman, Human Research  
Review Committee  
at Denton.

APPENDIX B  
INSTITUTIONAL RESEARCH GRANT PROPOSAL

TEXAS WOMAN'S UNIVERSITY  
COLLEGE OF HEALTH, PHYSICAL EDUCATION  
AND RECREATION  
INSTITUTIONAL RESEARCH

THE EFFECTS OF A MEDICALLY SUPERVISED EXERCISE PROGRAM  
ON THE SELF CONCEPT OF POST-INFARCT PATIENT

This study will be a new one to determine the effects of a medically supervised cardiac rehabilitation program on the self concept of post-infarct (heart attack) patients. A request for a study of this type was initiated by a trustee of the Dallas Cardiac Institute who is interested in comparing the impact of the Dallas Cardiac Institute's cardiac rehabilitation program with more orthodox physician office consultations of post-infarct patients. Thus, use of the site and liaison with cooperating parties have been virtually assured.

The hypothesis stated in the null is that there is no significant relationship between the measured criterion variables (amplified below) between post-infarct patients engaged in the Dallas Cardiac Institute compared with the control group. The basic research design being proposed is a pre-test, post-test repeated measures study. The treatment applied will be respectively the Dallas Cardiac Institute cardiac rehabilitation program for the experimental group and

cooperating cardiologists treating post-infarct patients on office consultation only for the control group. The criterion variables will be in three categories: (1) self concept as measured by an appropriate testing instrument such as the Tennessee Self Concept Scale; (2) attitudinal changes collected by interviews with patients and their spouses; and (3) behavioral changes as indicated by questionnaire responses, work attendance records, and observations of overt behavior.

Findings from this study will contribute to knowledge about the physical and mental re-orientation of post-infarct patients and the carry-over effects, if any, of a medically supervised exercise program. Rejection of the null hypothesis will not only signify the transferability of exercise to a more healthy lifestyle among post-infarct patients but will also suggest the generalization of this concept to other population groups.

Miles, as reported by Forssman and Lindegard<sup>1</sup> indicated that a heart attack leads to a collapse of the self-image. In a 2 x 2 factorial study of cardiac patients engaged in a graduated exercise program matched and compared

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<sup>1</sup>O. Forssman and B. Lindegard, "The Post Coronary Patient," Journal of Psychosomatic Research 3 (1958-1959): 103.



with a cardiac control group engaged in moderate activity over a twenty-four week period, McPherson, et. al.<sup>1</sup> demonstrated that cardiac exercisers experienced a greater number of favorable changes in personality characteristics.

This study will attempt to follow up these findings and seek to determine whether significant relationships exist between a medically supervised exercise program and the enhancement of self concept to the extent post-infarct patients develop more positive attitudes that will transcend the patient's personal life to affect his attitudes toward his family and those outside his family. Additionally, this study will seek to determine whether an improved self concept due to a medically supervised exercise program results in the adoption of more healthful patterns of living and increased work productivity.

Depression and a sense of helplessness often follow individuals who survive heart attacks. Self concept as the frame of reference through which an individual interacts with his environment probably suffers as a result. To rehabilitate these patients in psychological readjustment needs to be emphasized on the same par as physical

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<sup>1</sup>B. D. McPherson et al., "Psychological Effects of an Exercise Program for Post-Infarct and Normal Adult Men," Journal of Sports Medicine and Physical Fitness 7 (June 1967): 95-101.

recovery. Findings by various investigators suggest physical exercise after episodes of heart attacks enhances formation of favorable mood changes and gains in self-confidence. If self concept is assumed to be a major determinant of human behavior, attitudes and behavior of the post-heart attack patients will be affected. Improvements in attitudes and adoption of more healthful lifestyle will not only be of benefit to the immediate patient but to his family, his employer, and his circle of influence as well.

Procedures and evaluation of findings:

1. Explain the proposal of the Trustees of the Dallas Cardiac Institute and secure their approval for the project
2. Seek and secure the cooperation of Dallas area physicians who would be willing to participate in the control phase of the study
3. Obtain permission of subjects for the study
4. Match subjects based on previously determined physical, physiological, and social measures
5. Administer the entire battery of evaluative instruments to the pilot sample of the experimental and control groups

6. Make modifications of the evaluative instrument based on the pilot sample results as necessary in order to achieve research objectives
7. Administer the self-concept evaluative instrument as a pre-test to experimental and control groups
8. At appropriate intervals administer other evaluative instruments to include the self-concept evaluative instrument, interviews, and questionnaires
9. Collect and analyze the data
10. Prepare a written report of the study

## BUDGET

1. Graduate Research Assistant:

Moon S. Chen, Jr. (Doctoral  
candidate, one-fourth time) \$1,300.00

## 2. Student Assistants

144 hours x \$2.35 per hour 338.40

## 3. Supplies and Materials

Standardized tests 100.00

## 4. Expenses

Duplication and printing 250.00

Telephone (long distance calls) 25.60

Books to later be added to the  
Departmental Library 100.00

Total Requested Budget-----\$2,114.00

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Forssman O. and Lindegard B. "The Post Coronary Patient." Journal of Psychosomatic Research Volume 3, 89-169, 1958.

McPherson, B. D. et al., "Psychological Effects of Exercise Program for Post-Infarct and Normal Adult Men." Journal of Sport Medicine and Physical Fitness. Volume 7 (June 1967): 95-102.

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APPENDIX C  
LETTER APPROVING RESEARCH FROM THE  
DALLAS CARDIAC INSTITUTE

# DALLAS CARDIAC INSTITUTE

1341 WEST MOCKINGBIRD, SUITE 410E DALLAS, TEXAS 75247 (214) 630-2806

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## CONSULTANTS:

James M. Atkins, M.D.  
Gustav B. Bump, M.D.  
Robert A. Bruce, M.D.  
Kenne H. Caldwell, C.P.A.  
Craig M. Fowler, Atty.  
Samuel M. Fox, III, M.D.  
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Jeff O. Roberts, M.D.

## ADJUNCT TRUSTEES:

John G. O'Connor

Mr. Moon S. Chen, Jr.  
316 Fry Street, Apt. 171  
Denton, Texas 76201

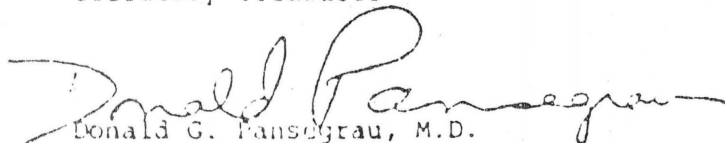
Dear Mr. Chen:

This letter will serve to officially authorize you to conduct research at the Dallas Cardiac Institute. We understand that the purpose of this research is to write your dissertation that has been tentatively titled "The Effects of a Medically Supervised Group Exercise Program on the Self-Concept and Life Style of Cardiac Patients". Your research may begin in November, 1977 and continue until concluded.

Sincerely,



Michael M. Dohn  
Secretary-Treasurer



Donald G. Panssegrau, M.D.

President  
Board of Trustees

APPENDIX D  
SAMPLE CONSENT FORMS



PART I  
TEXAS WOMAN'S UNIVERSITY  
FORM A

## TEXAS WOMAN'S UNIVERSITY

(From A -- Written presentation to subject)

Consent to Act as a Subject for Research and Investigation:

(The following information is to be read to or read by the subject):

1. I hereby authorize Mr. Moon S. Chen, Jr.  
(Name of person(s) who will perform  
procedure(s) or investigation(s))

to perform the following procedure(s) or investigation(s): (Describe in detail)

evaluate the effects of the Dallas Cardiac Institute on my self concept and my life stype by administering two printed evaluative instruments to me. One set of these evaluative instruments will be administered today, and the other set will be administered approximately three months later.

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Mr. Moon Chen or Mr. Mike Dehn

3. I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts: (Describe in detail)

None

(Form A - continuation)

3. I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

Findings from this study will contribute to knowledge about the effectiveness of a medically supervised group exercise program on how an individual feels about himself and what an individual does.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

\_\_\_\_\_  
Subject's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date of Birth

\_\_\_\_\_  
Address

PART II

AUTHORIZATION FOR THE RELEASE OF MEDICAL  
RECORDS FOR RESEARCH PURPOSES

AUTHORIZATION FOR THE RELEASE OF MEDICAL  
RECORDS FOR RESEARCH PURPOSES

I hereby authorize my physician, \_\_\_\_\_,  
to release my medical records to Texas Woman's University  
for the purpose of conducting research to evaluate the  
effectiveness of my present treatment. If the results of  
this research are to be published I realize that my  
individual identity will be withheld.

\_\_\_\_\_  
Date Signed\_\_\_\_\_  
Signature\_\_\_\_\_  
Witness

APPENDIX E

DALLAS CARDIAC SELF-CONCEPT SCALE

DO NOT LOOK BACK AND FORTH THROUGH THE ITEMS. Do not try to remember how you checked similar items earlier in this survey. Do not puzzle over individual items. It is your first impressions, the immediate "feeling" about the items that we want.

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY ACTUAL SELF  
or, what I really am like

competent	___ : ___ : ___ : ___ : ___ : ___ : ___	incompetent
meaningless	___ : ___ : ___ : ___ : ___ : ___ : ___	meaningful
feeling whole	___ : ___ : ___ : ___ : ___ : ___ : ___	feeling damaged
worthless	___ : ___ : ___ : ___ : ___ : ___ : ___	valuable
happy	___ : ___ : ___ : ___ : ___ : ___ : ___	sad
tense	___ : ___ : ___ : ___ : ___ : ___ : ___	relaxed
potent	___ : ___ : ___ : ___ : ___ : ___ : ___	impotent
negative	___ : ___ : ___ : ___ : ___ : ___ : ___	positive
important	___ : ___ : ___ : ___ : ___ : ___ : ___	unimportant
unsuccessful	___ : ___ : ___ : ___ : ___ : ___ : ___	successful
good	___ : ___ : ___ : ___ : ___ : ___ : ___	bad
sick	___ : ___ : ___ : ___ : ___ : ___ : ___	healthy
contented	___ : ___ : ___ : ___ : ___ : ___ : ___	anxious



WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY DESIRED SELF  
or, what I want to be

negative	___ : ___ : ___ : ___ : ___ : ___	positive
competent	___ : ___ : ___ : ___ : ___ : ___	incompetent
unsuccessful	___ : ___ : ___ : ___ : ___ : ___	successful
contended	___ : ___ : ___ : ___ : ___ : ___	anxious
sad	___ : ___ : ___ : ___ : ___ : ___	happy
good	___ : ___ : ___ : ___ : ___ : ___	bad
tense	___ : ___ : ___ : ___ : ___ : ___	relaxed
meaningful	___ : ___ : ___ : ___ : ___ : ___	meaningless
worthless	___ : ___ : ___ : ___ : ___ : ___	valuable
feeling whole	___ : ___ : ___ : ___ : ___ : ___	feeling damaged
impotent	___ : ___ : ___ : ___ : ___ : ___	potent
healthy	___ : ___ : ___ : ___ : ___ : ___	sick
unimportant	___ : ___ : ___ : ___ : ___ : ___	important

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY PAST SELF

or, what I was like before my coronary event

good	___:___:___:___:___:___:___	bad
incompetent	___:___:___:___:___:___:___	competent
successful	___:___:___:___:___:___:___	unsuccessful
sad	___:___:___:___:___:___:___	happy
important	___:___:___:___:___:___:___	unimportant
tense	___:___:___:___:___:___:___	relaxed
potent	___:___:___:___:___:___:___	impotent
meaningless	___:___:___:___:___:___:___	meaningful
positive	___:___:___:___:___:___:___	negative
anxious	___:___:___:___:___:___:___	contented
feeling whole	___:___:___:___:___:___:___	feeling damaged
worthless	___:___:___:___:___:___:___	valuable
healthy	___:___:___:___:___:___:___	sick

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY PRESENT SELF

or, what I am like since my coronary event

anxious	___ : ___ : ___ : ___ : ___ : ___	contented
positive	___ : ___ : ___ : ___ : ___ : ___	negative
sad	___ : ___ : ___ : ___ : ___ : ___	happy
healthy	___ : ___ : ___ : ___ : ___ : ___	sick
feeling damaged	___ : ___ : ___ : ___ : ___ : ___	feeling whole
successful	___ : ___ : ___ : ___ : ___ : ___	unsuccessful
bad	___ : ___ : ___ : ___ : ___ : ___	good
meaningful	___ : ___ : ___ : ___ : ___ : ___	meaningless
worthless	___ : ___ : ___ : ___ : ___ : ___	valuable
important	___ : ___ : ___ : ___ : ___ : ___	unimportant
impotent	___ : ___ : ___ : ___ : ___ : ___	potent
relaxed	___ : ___ : ___ : ___ : ___ : ___	tense
incompetent	___ : ___ : ___ : ___ : ___ : ___	competent

## WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

## MY FUTURE SELF

or, what I wish to be realizing the potential of my life  
after my coronary event

meaningful	__ : __ : __ : __ : __ : __ : __	meaningless
sad	__ : __ : __ : __ : __ : __ : __	happy
relaxed	__ : __ : __ : __ : __ : __ : __	tense
anxious	__ : __ : __ : __ : __ : __ : __	contented
positive	__ : __ : __ : __ : __ : __ : __	negative
unimportant	__ : __ : __ : __ : __ : __ : __	important
potent	__ : __ : __ : __ : __ : __ : __	impotent
unsuccessful	__ : __ : __ : __ : __ : __ : __	successful
good	__ : __ : __ : __ : __ : __ : __	bad
sick	__ : __ : __ : __ : __ : __ : __	healthy
contented	__ : __ : __ : __ : __ : __ : __	anxious
incompetent	__ : __ : __ : __ : __ : __ : __	competent
valuable	__ : __ : __ : __ : __ : __ : __	worthless
feeling damaged	__ : __ : __ : __ : __ : __ : __	feeling whole

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY FAMILY LIFE  
or, how I relate to my family

negative	_: _: _: _: _: _:	positive
relaxed	_: _: _: _: _: _:	tense
feeling damaged	_: _: _: _: _: _:	feeling whole
potent	_: _: _: _: _: _:	impotent
bad	_: _: _: _: _: _:	good
important	_: _: _: _: _: _:	unimportant
sad	_: _: _: _: _: _:	happy
healthy	_: _: _: _: _: _:	sick
unsuccessful	_: _: _: _: _: _:	successful
valuable	_: _: _: _: _: _:	worthless
incompetent	_: _: _: _: _: _:	competent
contented	_: _: _: _: _: _:	anxious
meaningless	_: _: _: _: _: _:	meaningful

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY SEX LIFE

or, how I relate to my sexual partner

feeling whole	___:___:___:___:___:___:___	feeling damaged
unimportant	___:___:___:___:___:___:___	important
competent	___:___:___:___:___:___:___	incompetent
meaningless	___:___:___:___:___:___:___	meaningful
happy	___:___:___:___:___:___:___	sad
unsuccessful	___:___:___:___:___:___:___	successful
good	___:___:___:___:___:___:___	bad
negative	___:___:___:___:___:___:___	positive
valuable	___:___:___:___:___:___:___	worthless
sick	___:___:___:___:___:___:___	healthy
relaxed	___:___:___:___:___:___:___	tense
anxious	___:___:___:___:___:___:___	tense
potent	___:___:___:___:___:___:___	impotent

WHAT DOES THE IDEA IN THE BOX MEAN TO YOU?

MY WORK LIFE  
or, how I relate to my colleagues

sick	___:___:___:___:___:___:___	healthy
potent	___:___:___:___:___:___:___	impotent
anxious	___:___:___:___:___:___:___	contented
successful	___:___:___:___:___:___:___	unsuccessful
incompetent	___:___:___:___:___:___:___	competent
feeling whole	___:___:___:___:___:___:___	feeling damaged
tense	___:___:___:___:___:___:___	relaxed
valuable	___:___:___:___:___:___:___	worthless
meaningless	___:___:___:___:___:___:___	meaningful
positive	___:___:___:___:___:___:___	negative
sad	___:___:___:___:___:___:___	happy
good	___:___:___:___:___:___:___	bad
unimportant	___:___:___:___:___:___:___	important

APPENDIX F  
LIFE STYLE CHANGE FACTORS SCALE



## LIFE STYLE CHANGE FACTORS SCALE

DIRECTIONS: Answer item 1 with a "No" or "Yes". For items 2 through 24 place an "x" in the space that corresponds to your answer.

1. Have you returned to your job since your cardiac event? \_\_\_\_\_

If you answered "No" to item 1, omit item 2 and proceed directly to item 3.

If you answered "Yes" to item 1, please continue with item 2.

2. How long after your cardiac event did you return to your job (in months)?

1 : 2 : 3 : 4 : 5 : 6 : 7 or more

How would you rate your current sleep pattern? (Answer items 3 and 4).

3. improving \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ deteriorating

4. sleepless \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ sound

5. How are you complying with your recommended or prescribed diet?

total compliance \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ total disregard

How would you rate your sex life? (Answer items 6 through 9)

6. enjoyable \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ hate it

7. inadequate \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ adequate

8. improving \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ deteriorating

9. frequency decreasing \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ frequency increasing

How would your child (children) rate you as a parent? (Answer items 10 through 13). Omit items 10 through 12 if you have no children and continue with item 13.

10. bad \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ good

11. friend \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ enemy

12. effective \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_ ineffective

How would your wife rate you as a husband? (Answer items 13 through 16).  
Omit items 13 through 16 if you are single.

13. effective    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    ineffective
14. irritable    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    pleasant
15. loving    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    hating
16. cold    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    intimate

How would your employer or supervisor rate you as a worker? (Answer items 17 and 18). Omit items 17 and 18 if you are no longer working.

17. productive    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    unproductive
18. consistent    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    consistent
- absence    \_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_:\_\_\_    attendance
19. How are you in regards to cigarette smoking?
- increasing    :   :   :   :   :   :   quit or never started

20. How many packs of cigarettes do you smoke daily?

$$\frac{\cdot}{0} \frac{\cdot}{1/2} \frac{\cdot}{1} \frac{\cdot}{11/2} \frac{\cdot}{2} \frac{\cdot}{21/2} \frac{\cdot}{3} \text{ or more}$$

How would you characterize the nature of your leisure recreational activities with your family? (Answer items 21 and 22).

21. sedentary      \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_      vigorous
22. once weekly      \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_      once every 7 weeks  
or more      \_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_:\_\_\_\_      or greater

How would you characterize your relationships with others outside your family and your job? (Answer items 23 and 24 preceded by the phrase, "I am . . .")

23. sociable \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ unsociable
24. inward  
directed        :        :        : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ outgoing

DIRECTIONS: Rank the below listed areas of an individual's life in terms of priority to you. Write in the spaces provided to the left of the areas. Assign 7 points to the area of your life that is your highest priority, assign 6 points to the area of your life that is your next higher priority, et cetera. Your lowest priority among these choices should have an assigned point value of 1.

Areas of Life:

\_\_\_\_\_ EDUCATION  
\_\_\_\_\_ FAMILY  
\_\_\_\_\_ JOB  
\_\_\_\_\_ POSSESSIONS  
\_\_\_\_\_ RECREATION  
\_\_\_\_\_ SOCIAL  
\_\_\_\_\_ SPIRITUAL

APPENDIX G  
TESTS OF INSTRUMENT RELIABILITY

PART I  
ESTIMATION OF INSTRUMENT RELIABILITY

## APPENDIX G, PART I

### ESTIMATION OF INSTRUMENT RELIABILITY<sup>1</sup>

Instrument reliability was estimated by successively applying the split-halves method and the Spearman-Brown prophecy formula to the Dallas Cardiac Self-Concept Scale and the Life Style Change Factors Scale. Reliability coefficients were obtained for both the first and the final measurements for each facet of self-concept and for the Life Style Change Factors Scale treated as a whole.

On the Dallas Cardiac Self-Concept Scale, the "odd-numbered" items on each facet of self-concept were compared with the "even-numbered" items of self-concept. Coefficients of equivalence (Pearson correlation coefficients) were calculated to measure the degrees of relationship between the "odd-numbered" items and the "even-numbered" items. Instructions for the SPSS subprogram, PEARSON CORR are detailed in Appendix G. Part II. The Pearson  $r$  obtained from this SPSS subprogram was substituted into the Spearman-Brown prophecy formula. This formula is as follows:

$$r_{nn} = \frac{2r}{1+r}$$

---

<sup>1</sup>Joseph Hill and August Kerber, Models, Methods, and Analytical Procedures in Education Research (Detroit: Wayne State University Press, 1967), pp. 288-289.

where  $r$  = the Pearson correlation coefficients obtained for "half"<sup>1</sup> of each facet of self-concept, and  $r_{nn}$  = the reliability coefficient of the entire facet of self-concept.

The reliability coefficients of the facets of self-concept on the Dallas Cardiac Self-Concept Scale were calculated to be as follows:

<u>Facets</u>	<u>Measurement</u>	
	<u>First</u>	<u>Final</u>
"My Actual Self"	0.7941	0.8260
"My Desired Self"	0.7828	0.4290
"My Past Self"	0.9256	0.8080
"My Present Self"	0.8736	0.7250
"My Future Self"	0.8473	0.7428
"My Family Life"	0.9070	0.7702
"My Sex Life"	0.9450	0.8861
"My Work Life"	<u>0.9411</u>	<u>0.8625</u>
MEANS	0.8771	0.7562
GRAND MEAN (first and final measurements) = 0.8167		

---

<sup>1</sup>An unequal number of items constituted the number of "odd-numbered" and "even-numbered" items. There were seven "odd-numbered" items and six "even-numbered" items for most of the facets of self-concept on the Dallas Cardiac Self-Concept Scale.

Similar procedures were followed in obtaining an estimation of reliability for the Life Style Change Factors Scale except that the entire instrument was divided into exactly two halves without regard for specific life style factors and without regard for omitted responses. (Omitted responses specifically those of "parent" and "husband" were treated as zeros in the computation). This procedure was chosen because the Life Style Change Factors Scale consisted of only twenty-four items. Thus, the "odd-numbered" items were compared with the "even-numbered" items. A coefficient of equivalence was calculated between the split-halves with the SPSS subprogram, PEARSON CORR (Appendix G, Part III). The same Spearman-Brown prophecy formula was applied to calculate the reliability of the lengthened instrument. In this application,  $r$  equaled the Pearson correlation coefficient obtained for half of the Life Style Change Factors Scale, and  $r_{nn}$  equaled the reliability coefficient of the entire Life Style Change Factors Scale. The reliability coefficients of the Life Style Change Factors Scale were calculated to be as follows:

	<u>Measurement</u>	
	<u>First</u>	<u>Final</u>
Life Style Change Factors Scale	0.8670	0.9152
MEAN (first and final measurement) = 0.8911		



PART II

SPSS SUBPROGRAM, PEARSON CORR,  
FOR DALLAS CARDIAC SELF-CONCEPT SCALE

## APPENDIX G, PART II

### SPSS Subprogram, PEARSON CORR, for Dallas Cardiac Self-Concept Scale

A set of sample instructions for the execution of the SPSS subprogram, PEARSON CORR, as adapted for this investigation is detailed below. (All capital letters indicate the execution instructions for the computer. The length of instructions on each line is equivalent to the length of instructions on each separate card. Regular type indicates editorial comments.)

RUN NAME	CALCULATION OF PEARSON CORR OF DALLAS CARDIAC SELF CONCEPT SCALE TO DETERMINE INSTRUMENT RELIABILITY, FIRST MEASUREMENT
FILE NAME	RELDCSIPEARSONCORR                      JULY 4, 1978
COMMENT	BLANKS AND ZEROS ARE NOT DISTINGUISHED, I.E. RESPONSES THAT ARE LEFT BLANK, AND THOSE THAT HAVE BEEN GIVEN ZEROS AS THEIR VALUES ARE TREATED THE SAME.
VARIABLE LIST	ID, PHASE, ACT01 TO ACT13, DES01 TO DES13, PAS01 TO PAS 13, PRE01 TO PRE 13, FUT01 TO FUT14, FAM01 TO FAM13, SAX01 TO SAX13, WRK01 TO WRK13, ACTUAL, DESIRED, PRESENT, FUTURE
INPUT MEDIUM	CARD
N OF CASES	51
INPUT FORMAT	FIXED(F3.0,F1.0,36X,39F1.0/4X,66F1.0/26X,2F3.0,3X,2F3.0
COMPUTE	ACTODD=ACT01+ACT03+ACT05+ACT07+ACT09+ACT11+ACT13
COMPUTE	ACTEVEN=ACT02+ACT04+ACT06+ACT08+ACT10+ACT12
COMPUTE	DESODD=DES01+DES03+DES05+DES07+DES09+DES11+DES13
COMPUTE	DESEVEN=DES02+DES04+DES06+DES08+DES10+DES12
COMPUTE	PASODD=PAS01+PAS03+PAS05+PAS07+PAS09+PAS11+PAS13
COMPUTE	PASEVEN=PAS02+PAS04+PAS06+PAS08+PAS10+PAS 12
COMPUTE	PREODD=PRE01+PRE03+PRE05+PRE07+PRE09+PRE11+PRE13
COMPUTE	PREEVEN=PRE02+PRE04+PRE06+PRE08+PRE10+PRE12
COMPUTE	FUTODD=FUT01+FUT03+FUT05+FUT07+FUT09+FUT11+FUT13
COMPUTE	FUTEVE=FUT02+FUT04+FUT06+FUT08+FUT10+FUT12+FUT14
COMPUTE	FAMODD=FAM01+FAM03+FAM05+FAM07+FAM09+FAM11+FAM13
COMPUTE	FAMEVEN=FAM02+FAM04+FAM06+FAM08+FAM10+FAM12
COMPUTE	SEXODD=SAX01+SAX03+SAX05+SAX07+SAX09+SAX11+SAX13
COMPUTE	SEXEVEN=SAX02+SAX04+SAX06+SAX08+SAX10
COMPUTE	WRKODD=WRK01+WRK03+WRK05+WRK07+WRK09+WRK11+WRK13
COMPUTE	WRKEVEN=WRK02+WRK04+WRK06+WRK08+WRK10+WRK12
LIST CASES	CASES=51/VARIABLES=ALL/

PART III

SPSS SUBPROGRAM, PEARSON CORR,  
FOR LIFE STYLE CHANGE FACTORS SCALE

### APPENDIX G, PART III

#### SPSS Subprogram, PEARSON CORR, for Life Style Change Factors Scale

A set of sample instructions for the execution of the SPSS subprogram, PEARSON CORR, as adapted for this investigation is detailed below. (All capital letters indicate the execution instructions for the computer. The length of instructions on each line is equivalent to the length of instructions on each separate card. Regular type indicates editorial comments).

RUN NAME	CALCULATION OF PEARSON CORR OF LIFE STYLE CHANGE FACTORS SCALE TO DETERMINE INSTRUMENT RELIABILITY, FINAL MEASUREMENT.
FILE NAME	RELLSCZPEARSONCORR      JULY 3, 1978
VARIABLE LIST	ID,PHASE,LIFE01 TO LIFE 09,LIFE10 TO LIFE24
INPUT MEDIUM	CARD
N OF CASES	51
INPUT FORMAT	FIXED(/F3.0,F1.0,66X,9F1.0/15F1.0)
COMPUTE	LIFEODD=LIFE01+LIFE03+LIFE05+LIFE07+LIFE09+LIFE11+ LIFE13+LIFE15+LIFE17+LIFE19+LIFE21+LIFE23
COMPUTE	LIFEEVEN=LIFE02+LIFE04+LIFE06+LIFE08+LIFE10+LIFE12+ LIFE14+LIFE16+LIFE18+LIFE20+LIFE22+LIFE24
PEARSON CORR OPTIONS	LIFEODD WITH LIFEEVEN 1, 6
READ INPUT DATA	
Place data cards here.	
FINISH	

PEARSON CORR    ACTODD WITH ACTEVEN/DESODD WITH DESEVEN/PASODD WITH  
PASEVEN/  
PREODD WITH PREEVEN/FUTODD WITH FUTEVEN/FAMODD WITH  
FAMEVEN/  
SEXODD WITH SEXEVEN/WRKODD WITH WRKEVEN/ACTUAL WITH  
PRESENT/  
DESIRED WITH FUTURE

OPTIONS            1, 6

READ INPUT DATA

Place data cards here.

FINISH

## APPENDIX H

### PAIRED COMPARISON QUESTIONNAIRE

"WHICH FACTOR IS MORE IMPORTANT IN CARDIAC REHABILITATION?"

## APPENDIX H

### WHICH FACTOR SEEMS TO BE MORE IMPORTANT IN CARDIAC REHABILITATION?

Purpose and Directions: The following forty-five items are written in a form which asks the respondent to choose between which one of the two factors in each item are more important in cardiac rehabilitation. Each of these factors are operationally defined on the following page. After analysis by this researcher, the result will be a ranking of these factors coupled with a measurement of the relative distance between these rankings. Please circle one choice for EACH pair of factors.

Directions: Please circle one choice for EACH pair of factors.

1. diet versus sex life
2. worker versus smoking
3. job versus relationships with others
4. sleep versus parent
5. sex life versus worker
6. husband versus recreation
7. job versus husband
8. parent versus diet
9. smoking versus sleep
10. smoking versus sex life
11. recreation versus diet
12. worker versus diet
13. diet versus job
14. parent versus job
15. diet versus husband
16. husband versus worker
17. worker versus job
18. smoking versus husband
19. worker versus relationships with others

20. sleep versus diet
21. sleep versus recreation
22. relationships with others versus sex life
23. sex life versus sleep
24. diet versus relationships with others
25. sleep versus worker
26. parent versus relationships with others
27. smoking versus recreation
28. recreation versus relationships with others
29. worker versus parent
30. job versus sex life
31. recreation versus parent
32. husband versus sex life
33. husband versus sleep
34. parent versus husband
35. sex life versus parent
36. job versus smoking
37. job versus sleep
38. parent versus smoking
39. relationships with others versus sleep
40. relationships with others versus parent
41. recreation versus worker
42. sex life versus recreation
43. recreation versus job
44. diet versus smoking
45. relationships with others versus recreation



## DEFINITION OF FACTORS

The following is a glossary of the factors used in the questionnaire on the preceeding pages entitled, "WHICH FACTOR SEEMS TO BE MORE IMPORTANT IN CARDIAC REHABILITATION?" All factors relate to the time period after the respondent's heart troubles.

DIET:	the degree to which one cooperates with his physician in attaining a prescribed diet
JOB:	the determination as to whether one has returned to his employment after his heart trouble or to other gainful employment
HUSBAND:	the quality of one's interrelationships with his wife as judged by the respondent
PARENT:	the extent to which one relates effectively with his child(ren) as judged by the respondent
RECREATION:	the frequency and activity level of one's recreational activities with others in his family
RELATIONSHIPS WITH OTHERS	one's perceptions of his own social relationships with others outside his family
SEX LIFE:	the degree to which one's sexual intercourse has become more satisfying and more frequent
SLEEP	the quality of one's sleep
SMOKING:	the quantity of cigarettes smoked.
WORKER:	one's work attendance record and work quality as perceived by the respondent

-----  
Comments and suggestions:

Would you like a copy of the finalized instrument? \_\_\_\_\_

Your name, title, and address \_\_\_\_\_  
(Optional)

## APPENDIX I

MEMBERSHIP OF THE EXPERT JURY ON THE WEIGHTED IMPORTANCE  
OF FACTORS IN CARDIAC REHABILITATION

## APPENDIX I

### MEMBERSHIP OF THE EXPERT JURY ON THE WEIGHTED IMPORTANCE OF FACTORS IN CARDIAC REHABILITATION

JOHN H. COOPER, P.E.D.  
Chairperson, Department of Health and  
Physical Education  
George Mason University  
Fairfax, Virginia

PAUL KNIPPING, Ph.D.  
Associate Professor - Division of  
Health Education  
Texas Tech University  
Lubbock, Texas

JERE H. MITCHELL, M.D.  
Southwestern Medical School  
University of Texas Health Science Center  
Dallas, Texas

BETTY TEVIS, PH.D.  
Chief - Section on Heart Health Education in  
the Young  
American Heart Association  
Dallas, Texas

DONALD L. WHALEY, Ph.D.  
Director - Center for Behavioral Studies  
North Texas State University  
Denton, Texas

## APPENDIX J

### EXPERT JURY'S VERDICT ON THE WEIGHTED IMPORTANCES OF FACTORS IN CARDIAC REHABILITATION

## APPENDIX J

### EXPERT JURY'S VERDICT ON THE WEIGHTED IMPORTANCES OF FACTORS IN CARDIAC REHABILITATION

Weighting of various life style factors with respect to their importance in cardiac rehabilitation was attempted by soliciting expert opinions. An analysis<sup>1</sup> of the five member expert jury's judgments indicated that assignment of numerically disparate weights would probably be arbitrary. The difference between the highest weight and lowest weight given to the life style factors were approximately half a unit (0.57). Thus, the importance of all life style factors was considered to be approximately the same. In other words, the composite opinion of the expert jury was that each of the life style factors investigated was approximately equal in importance.

On the other hand, the expert jury's decisions yielded a hierarchy of life style factors arranged in order of relative importance in cardiac rehabilitation. This hierarchial order and the proportion of times the particular life style factor was judged to be greater

---

<sup>1</sup>Opinions of the five members of the expert jury were analyzed by a modification of the method of paired comparisons. Raw data were transformed to result in the observed proportion of times each life style factor was judged greater than all other life style factors compared.

than all other life style factors is amplified as follows:

<u>Life style factors</u>	<u>P x 10</u>
Diet	1.32
Relationships with others	1.20
Smoking	1.10
Husband	1.06
Job	1.06
Parent	0.97
Sleep	0.96
Worker	0.92
Sex life	0.85
Recreation	0.75

P = proportion of times life style factor judged to be great than life style factor being compared

P x 10 = multiplication for purposes of easier comparison

---

separately. The procedures described above were a modification of Torgerson's reference in Theory and Methods of Scaling.

APPENDIX K

CAUSES OF DEATH FOR SIX POTENTIAL MEMBERS  
OF THE CONTROL GROUP

CAUSES OF DEATH FOR SIX POTENTIAL MEMBERS OF THE  
CONTROL GROUP

Listed below are the causes of death for six who were prescribed the Dallas Cardiac Institute medically supervised exercise regimen, but for some reason failed to follow through:

<u>Causes of death</u>	<u>Number</u>
Automobile accident	1
Carcinoma of the lung	1
Cardiac causes	3
Suicide	1



APPENDIX L  
SUMMARY OF THE RAW DATA

## DALLAS CARDIAC SELF-CONCEPT SCALE\*

## SUMMARY OF RAW DATA FROM THE EXPERIMENTAL GROUP

ID	AGE	1st Dx	(91) ACTUAL		(91) DESIRED		(91) PAST		(91) PRESENT		(98) FUTURE		(91) FAMTOT		(84) SEXTOT		(91) WORK	
			M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
1. 001	59	BP	91	91	91	91	66	91	91	91	91	91	91	91	84	31	91	91
2. 002	57	BP	65	42	84	78	54	46	67	47	85	62	66	60	43	31	69	51
3. 003	48	CP	53	46	84	79	42	70	32	30	56	77	27	32	34	48	25	25
4. 006	59	BP	88	91	91	91	0	85	85	91	91	91	91	91	84	84	91	91
5. 007	48	MI	89	89	89	91	80	85	90	91	91	91	90	91	83	84	82	82
6. 010	56	NR	62	56	79	78	58	64	63	64	80	78	73	69	67	69	72	72
7. 011	45	MI	80	81	91	91	64	69	78	74	90	91	77	79	81	79	78	75
8. 012	48	CP	84	86	85	91	85	89	84	86	85	91	85	91	84	84	87	80
9. 013	54	MI	77	83	88	91	76	81	77	78	83	84	76	77	71	72	77	77
10. 014	46	MI	73	49	91	55	81	49	75	55	91	55	79	55	72	42	78	55
11. 017	58	BP	69	78	91	91	79	80	77	73	91	91	84	83	77	63	87	82
12. 018	47	MI	55	61	89	90	59	60	58	62	91	85	52	62	51	57	61	64
13. 019	68	CP	85	76	91	72	87	79	80	77	90	79	86	78	84	75	84	80
14. 021	56	BP	81	82	91	86	79	0	79	81	9	91	91	86	83	83	79	84
15. 022	68	MI	91	90	91	91	81	80	91	91	91	91	13	91	15	84	14	91
16. 023	69	CP	40	65	59	66	65	68	30	62	67	63	50	69	25	63	58	70
17. 028	47	BP	76	76	77	91	91	91	77	76	81	89	83	83	84	83	39	0
18. 029	57	MI	54	53	49	48	53	54	50	52	49	49	47	50	52	53	50	51
19. 031	44	MI	69	68	87	79	70	72	73	73	88	78	72	73	53	31	65	63
20. 032	61	CP	77	0	84	74	73	0	71	72	80	0	77	77	40	0	62	71
21. 033	57	NR	88	79	89	80	90	82	87	79	82	78	86	78	84	82	82	81
22. 036	40	MI	72	91	75	91	79	77	68	72	91	91	64	88	63	43	82	91
23. 037	36	CP	68	71	91	73	73	72	59	65	91	79	80	79	62	70	75	72
24. 038	54	MI	74	79	91	91	82	85	78	80	91	91	86	87	84	83	79	84
25. 039	59	MI	70	69	84	77	73	70	65	69	68	76	41	74	41	63	33	66
26. 040	62	MI	91	91	91	91	85	84	91	91	91	91	91	91	84	84	91	91
27. 041	49	CP	75	86	91	91	91	86	91	84	91	91	81	48	48	66	52	55
28. 042	47	MI	84	88	91	91	91	91	80	88	91	91	86	89	84	84	88	91
29. 043	52	MI	58	58	58	56	67	60	52	61	71	83	57	66	47	68	54	70
30. 044	65	OT	79	79	87	90	77	71	81	79	89	87	84	79	43	56	84	78
31. 045	48	MI	70	74	74	78	72	71	69	67	77	77	66	78	65	70	70	74
32. 047	62	OT	87	86	91	89	89	87	86	87	91	89	89	89	82	82	91	89
Means	53.9		74.2	72.3	84.2	81.9	72.3	70.3	73.0	73.4	83.9	79.7	72.5	76.1	64.2	64.6	69.7	71.8

\*Figures in parentheses above each facet of self-concept refer to the maximum score per measurement for the factor indicated below the parentheses.

## Key for Experimental Group--Dallas Cardiac Self-Concept Scale

## Key:

ID Patient identification number  
 AGE Subject's age  
 1st Dx Chronologically first diagnosis  
 of Cardiac Disorder  
 MI Myocardial infarction  
 CP Chest pain or discomfort (currently)  
 BP Cardia bypass surgery  
 NR Not reported or no authorization  
 given to release patient's medical  
 history

ACTUAL My Actual Self  
 DESIRED My Desired Self  
 PAST My Past Self  
 PRESENT My Present Self  
 FUTURE My Future Self  
 FAMTOT My Family Life  
 SEXTOT My Sex Life  
 WORK My Work Life  
 M1 First Measurement  
 M2 Second Measurement

## DALLAS CARDIAC SELF-CONCEPT SCALE\*

## SUMMARY OF RAW DATA FROM THE CONTROL GROUP

ID	AGE	1st Dx	(91) ACTUAL		(91) DESIRED		(91) PAST		(91) PRESENT		(98) FUTURE		(91) FAMTOT		(84) SEXTOT		(91) WORK	
			M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
1. 505	50	MI	87	89	91	91	0	69	89	90	0	91	90	84	0	84	90	84
2. 507	NR	NR	54	45	90	74	59	47	52	45	88	72	67	54	42	54	91	72
3. 508	55	CP	79	78	78	78	78	78	78	78	78	78	78	78	72	72	78	85
4. 510	NR	MI	57	53	47	91	13	72	50	50	91	90	69	60	12	37	27	0
5. 511	43	BP	38	27	84	91	77	86	29	43	76	91	36	34	23	33	27	32
6. 512	NR	NR	74	67	91	75	68	75	75	74	75	75	26	66	27	55	24	72
7. 515	61	MI	75	89	91	90	80	87	56	63	78	89	73	89	60	79	78	88
8. 516	55	NR	77	74	87	86	77	78	68	73	87	85	59	75	70	73	72	64
9. 518	50	NR	71	69	23	91	13	65	67	63	91	91	52	63	37	50	76	77
10. 519	57	MI	58	54	91	86	71	62	58	55	81	67	66	53	46	42	60	67

## Key:

ID	Patient identification number	ACTUAL	My Actual Self
AGE	Subject's age	DESIRED	My Desired Self
1st Dx	Chronologically first diagnosis of cardiac disorder	PAST	My Past Self
		PRESENT	My Present Self
MI	Myocardial infarction	FUTURE	My Future Self
CP	Chest pain or discomfort (currently)	FAMTOT	My Family Life
BP	Cardia bypass surgery	SEXTOT	My Sex Life
NR	Not reported or no authorization given to release patient's medical history	WORK	My Work Life
		M1	First Measurement
		M2	Second Measurement

\*Figures in parentheses above each facet of self-concept refer to the maximum score per measurement for the factor indicated below the parentheses.

ID	AGE	1st Dx	(91) ACTUAL		(91) DESIRED		(91) PAST		(91) PRESENT		(98) FUTURE		(91) FAMTOT		(84) SEXTOT		(91) WORK	
			M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
11. 522	69	MI	66	49	85	80	77	70	61	44	83	79	59	39	24	24	40	35
12. 523	NR	NR	79	75	85	85	76	78	70	80	88	86	82	80	76	76	81	80
13. 525	31	MI	71	64	91	91	77	82	69	64	91	91	72	64	75	68	78	56
14. 530	40	MI	76	82	80	90	59	66	80	81	79	89	84	84	84	84	85	83
15. 531	44	MI	87	86	91	91	83	77	89	88	91	91	89	83	80	83	90	90
16. 533	54	VA	71	75	84	91	59	40	72	85	82	90	79	83	69	81	51	83
17. 541	50	CP	67	78	90	78	76	64	77	74	85	90	74	68	70	69	79	74
18. 544	49	MI	61	60	91	91	61	63	60	53	86	91	48	57	18	27	55	53
19. 548	50	MI	82	84	91	89	65	73	89	85	91	89	90	86	84	83	91	83
Means	50.5		70.0	68.3	82.2	86.3	61.5	70.1	68.3	67.8	80.1	85.5	68.1	68.9	51.2	61.8	67.0	67.2

## Key:

ID	Patient identification number	ACTUAL	My Actual Self
AGE	Subject's age	DESIRED	My Desired Self
1st Dx	Chronologically first diagnosis of cardiac disorder	PAST	My Past Self
		PRESENT	My Present Self
MI	Myocardial infarction	FUTURE	My Future Self
CP	Chest pain or discomfort (currently)	FAMTOT	My Family Life
VA	Vertricular arrhythcias	SEXTOT	My Sex Life
NR	Not reported or no authorhization given to release patient's medical history	WORK	My Work Life
		M1	First Measurement
		M2	Second Measurement

LIFE STYLE CHANGE FACTORS SCALE\*

SUMMARY OF RAW DATA FROM THE EXPERIMENTAL GROUP

ID	(10) RETJOB		(14) SLEEP		(7) DIET		(28) SEXLIFE		(21) PARENT		(28) HUSBAND		(14) SMOKING		(14) WORKER		(14) RECREAT		(14) RELATION	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
1. 001	10	9	14	13	6	6	28	26	21	21	28	24	14	7	14	14	14	12	14	6
2. 002	1	1	8	11	7	4	2	22	17	21	16	27	7	14	14	0	8	14	8	14
3. 003	6	7	6	11	3	6	15	26	12	18	8	24	7	14	13	13	2	7	4	11
4. 006	10	1	7	8	6	4	25	16	21	9	28	16	14	8	14	8	10	8	14	8
5. 007	9	1	12	11	6	6	23	20	21	21	28	27	10	14	14	13	13	12	14	14
6. 010	8	9	10	8	6	4	19	21	17	15	22	18	13	7	12	14	9	5	9	3
7. 011	9	9	11	13	7	6	25	26	20	21	24	24	14	7	13	14	11	12	11	6
8. 012	1	1	14	11	6	4	28	22	19	21	28	27	14	14	0	0	14	14	14	14
9. 013	9	7	9	11	6	6	24	26	18	18	25	24	14	14	13	13	10	7	11	11
10. 014	1	1	12	8	6	4	24	16	18	9	24	16	14	8	13	8	13	8	12	8
11. 017	8	1	9	11	7	6	11	20	21	21	28	27	14	14	14	13	8	12	14	14
12. 018	9	9	8	8	4	4	17	21	14	15	16	18	14	7	13	14	4	5	8	3
13. 019	10	10	14	11	6	4	28	22	21	21	28	28	14	14	14	14	12	9	11	14
14. 021	9	9	12	14	4	4	22	21	21	21	27	26	14	13	13	14	12	12	12	14
15. 022	7	8	3	14	7	6	11	23	21	21	18	28	14	14	14	0	14	12	11	10
16. 023	10	10	4	8	7	4	7	19	12	21	19	28	14	0	14	14	5	12	8	12
17. 028	8	8	14	14	6	6	25	25	21	21	28	28	14	7	0	0	2	8	8	9
18. 029	9	8	8	8	5	6	17	18	14	15	16	16	8	8	8	7	8	5	8	8
19. 031	9	10	14	14	5	0	16	7	18	18	19	20	14	14	13	13	12	14	8	9
20. 032	10	10	10	10	6	6	14	12	14	18	0	0	14	0	13	0	8	0	9	0
21. 033	10	10	10	12	6	6	21	21	19	14	22	24	14	14	13	13	8	9	9	9
22. 036	9	9	14	10	7	6	7	15	21	21	28	28	14	14	14	0	8	7	8	10
23. 037	1	8	10	9	7	0	23	20	18	17	20	20	14	14	0	13	11	10	11	11
24. 038	8	2	8	11	6	5	25	28	12	16	24	24	14	14	0	14	9	13	8	8
25. 039	6	8	5	6	6	6	13	18	18	18	24	24	14	7	11	0	12	9	8	8
26. 040	8	9	14	13	7	7	28	28	21	21	28	28	7	14	14	14	12	14	14	14
27. 041	1	1	14	14	2	2	16	16	12	0	16	0	9	11	0	0	2	6	13	13
28. 042	1	7	13	14	7	7	27	25	21	21	28	28	14	14	14	14	13	13	14	14
29. 043	8	8	11	12	6	5	15	22	18	21	21	21	14	14	13	13	12	13	9	11
30. 044	10	10	11	11	5	5	7	13	19	19	27	28	7	6	14	14	4	9	12	12
31. 045	10	9	10	11	6	6	21	22	0	0	21	21	11	9	11	9	13	12	10	10
32. 047	2	10	9	10	7	7	20	20	21	20	28	28	7	14	14	14	13	14	13	11
Means	7.1	7.4	10.3	11.1	5.9	5.1	18.9	19.6	18.1	18.1	23.5	23.2	12.3	10.9	11.1	9.9	9.6	9.9	10.4	9.8

\*Figures in parenthese above each life style factor refer to the maximum score per measurement for the factor indicate below the parentheses.

Key for Experimental Group--Life Style Change Factors Scale

ID	Patient identification number	SEXLIFE	The degree to which one's sexual intercourse has become more satisfying and more frequent	SMOKING	The quantity of cigarettes smoked
RETJOB	Return to job rating with higher value assigned to return to one's job in fewer months after a cardiac event	PARENT	The extent to which one relates effectively with his child(ren) as judged by the respondent	WORKER	One's work attendance record and quality as perceived by the respondent
SLEEP	The quality of one's sleep	HUSBAND	The quality of one's interrelationships with his wife as judged by the respondents	RECREAT	The frequency and activity level of one's recreational activities with others in his family
DIET	The degree to which one cooperates with his physician in attaining a prescribed diet			RELATION	One's perceptions of his own social relationships with others outside his family
				M1	First measurement
				M2	Second measurement

LIFE STYLE CHANGE FACTORS SCALE\*

SUMMARY OF RAW DATA FROM THE CONTROL GROUP

ID	(10) RETJOB		(14) SLEEP		(7) DIET		(28) SEXLIFE		(21) PARENT		(28) HUSBAND		(14) SMOKING		(14) WORKER		(14) RECREAT		(14) RELATION	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
1. 505	1	1	13	12	6	7	7	25	8	20	12	24	14	14	11	0	8	13	14	13
2. 507	1	4	7	14	5	7	22	15	21	21	25	19	8	7	0	14	3	3	13	12
3. 508	0	2	11	11	4	5	21	21	18	11	24	24	7	14	13	13	6	8	11	10
4. 510	1	1	11	13	3	5	7	6	21	21	25	27	5	10	14	0	9	9	6	10
5. 511	1	9	7	3	7	4	10	6	12	12	16	12	9	14	0	0	8	2	12	14
6. 512	7	4	14	14	6	6	6	16	10	18	24	18	7	14	14	13	4	3	8	9
7. 515	8	9	11	12	5	7	16	26	20	21	24	26	8	7	12	14	9	12	12	14
8. 516	10	10	12	8	5	4	21	20	14	14	23	19	7	14	12	13	6	7	10	8
9. 518	5	6	4	10	2	5	13	18	14	19	15	21	8	8	14	14	6	8	13	12
10. 519	8	8	10	8	4	5	12	8	18	15	11	15	14	14	13	7	14	10	12	12
11. 522	1	1	9	9	7	6	9	10	18	17	13	12	7	14	0	0	8	13	6	11
12. 523	5	5	13	14	3	3	23	25	17	21	27	27	7	14	9	6	6	5	8	8
13. 525	9	9	11	11	6	6	18	17	0	21	25	21	10	12	0	0	5	8	7	8
14. 530	6	5	9	9	5	4	27	25	16	18	25	25	7	7	11	13	10	9	12	10
15. 531	6	6	14	14	3	3	19	21	16	17	18	11	14	14	14	14	12	12	13	13
16. 533	9	9	13	12	6	6	17	27	20	20	21	24	14	14	13	14	11	12	12	13
17. 541	9	9	13	12	4	4	24	14	18	18	24	14	10	11	14	14	13	12	12	12
18. 544	10	10	5	5	7	7	10	13	19	21	9	17	14	14	14	14	2	9	2	3
19. 548	8	9	14	11	3	5	23	26	0	0	0	0	14	14	14	14	9	9	13	14
Means	5.5	6.2	10.6	10.6	4.8	5.2	15.5	17.8	15.6	18.1	20.1	19.8	9.7	12.1	10.1	9.3	7.8	8.6	10.3	10.8

Key for Experimental Group--Life Style Change Factors Scale

Key:

ID	Patient identification number	SMOKING	The quantity of cigarettes smoked
RETJOB	Return to job rating with higher value assigned to return to one's job in fewer months after a cardiac event	WORKER	One's work attendance record and quality as perceived by the respondent
SLEEP	The quality of one's sleep	RECREAT	The frequency and activity level of one's recreational activities with others in his family
DIET	The degree to which one cooperates with his physician in attaining a prescribed diet	RELATION	One's perceptions of his own social relationships with others outside his family
SEXLIFE	The degree to which one's sexual intercourse has become more satisfying and more frequent	M1	First measurement
		M2	Second measurement
PARENT	The extent to which one relates effectively with his child(ren) as judged by the respondent		
HUSBAND	The quality of one's interrelationships with his wife as judged by the respondents		

## APPENDIX M

### SPSS SEQUENCING FORMATS FOR DATA ENTRY AND DATA MANIPULATION BY COMPUTER

PART I  
DATA ENTRY FORMAT

## APPENDIX M, PART I

### DATA FORMAT FOR KEYPUNCHING

The following is a listing of the coding corresponding to the IBM cards and columns on the designated cards.

#### Card 1

<u>Columns</u>	<u>Coding</u>
1-3	Patient identification code
4	Designation of either: "1" for pilot phase "2" for experimental phase, first measurement "3" for experimental phase, final measurement
5	Sex of patient: "1" for male "2" for female (no females were studied)
6	Treatment effect: "1" for control group "2" for experimental group
7-8	Code of treating physician
9-10	Month of first cardiac condition "00" if unknown "01" for first month of the year through "12" for the twelfth month of the year
11-12	Day of first cardiac condition "00" if unknown "01" through "31" for the first through the the thirty-first day of the month
13-14	Year of the first cardiac condition last two digits of the year "00" if unknown
15-16	Month of second cardiac condition Same coding as for the "Month of first cardiac condition"



<u>Columns</u>	<u>Coding</u>
17-18	Day of second cardiac condition Same coding as for the "Day of first cardiac condition"
19-20	Year of second cardiac condition Same coding as for "Year of first cardiac condition"
21-22	Month entering Dallas Cardiac Institute for treatment Same coding as for the "Month of first cardiac condition"
23-24	Day entering Dallas Cardiac Institute for treatment Same coding as for the "Day of first cardiac condition"
25-26	Year entering Dallas Cardiac Institute for treatment Same coding as for the Year of first cardiac condition"
27-28	Year of patient's birth (last two digits) "00" if unknown
29	Code of chronologically earliest cardiac condition "1" for myocardial infarction "2" for chest pain or discomfort (currently) "3" for cardiac bypass surgery "4" for ventricular arrhythmias "9" for other "0" if not reported or unknown
30	Code of chronologically second cardiac condition Coding same as for "Code of chronologically earliest cardiac condition"
31-33	Code of any other cardiac conditions listed in chronological order from third earlier through fifth earliest cardiac condition Coding same as for "Code of chronologically earliest cardiac condition"

ColumnsCoding

- 34 Coding for this column was different for the first and final measurements of the experimental phase.  
During the first measurement, "9" was recorded for all experimental group subjects. The number, "0" was recorded for all control group subjects.  
During the final measurement, the subject's consent status was recorded. The coding was as follows:  
    "1" for no consent given  
    "2" for TWU Form A consent signed only  
    "4" for both TWU Form A consent signed and "AUTHORIZATION FOR THE RELEASE OF MEDICAL RECORDS FOR RESEARCH PURPOSES" signed
- 35-37 Number of weeks enrolled in Dallas Cardiac Institute: information based on enrollment from patient's entry to program through November 30, 1977. Control group subjects were automatically coded as "0".
- 38-40 Coding for these three columns was different for the first and final measurements of the experimental phase.  
During the first measurement, "000" was recorded in all control group subjects. For experimental group subjects, the entry was either the number of weeks that the subject participated in the exercise sessions during the investigative period through November 30, 1977, or if subjects entered the study after November 30, 1977, "000" was recorded. During the final measurement, "000" was recorded in all control group subjects. For experimental group subjects, the approximate number of Dallas Cardiac Institute exercise sessions attended during the interval of the particular subject's first and final measurement was recorded in these columns. Figures were "right-justified",

ColumnsCoding

Beginning with column 41 of card 1, responses to either the Dallas Cardiac Self-Concept Scale or the Life Style Change Factors Scale were recorded. Unless otherwise indicated, in both of these instruments, omitted responses were treated by recording "0" or leaving the column blank. A "1" was recorded for a response on the space closest to the left side of the paper. A "7" was recorded for a response on the space closest to the right side of the paper. Spaces between "1" and "7" had values recorded between "2" and "6" corresponding to their distances from the poles.

Responses on the Dallas Cardiac Self-Concept Scale began on column 41 of card 1, and ended with column 70 of card 2.

41-53	Responses to "My Actual Self"
54-66	Responses to "My Desired Self"
67-79	Responses to "My Past Self"
80	Code designated card 1 of data = 1

## Card 2

ColumnsCoding

1-4	Patient identification information (identical to columns 1-4 of card 1)
5-17	Responses to "My Present Self"
18-31	Responses to "My Future Self"
32-44	Responses to "My Family Life"
45-57	Responses to "My Sex Life"
58-70	Responses to "My Work Life"

Responses to the Life Style Change Factors Scale began with column 71 of card 2 and ended with column 26 of card 3. Responses to the factors corresponding to the columns were listed below. Numbers in parentheses indicated the corresponding item numbers on the Life Style Change Factors Scale.

<u>Columns</u>	<u>Coding</u>
71	(1) Job. This was the only "yes-no" question on the Life Style Change Factors Scale. A "1" was recorded if the response was "no". A "2" was recorded if the response was "yes".
72	(2) Job
73-74	(3-4) Sleep
75	(5) Diet
76-79	(6-9) Sex Life
80	Code designated card 2 of data = 2

## Card 3

<u>Columns</u>	<u>Coding</u>
1-4	Patient identification information (identical to columns 1-4 of card 1)
507	(10-12) Parent
8-11	(13-16) Husband
12-13	(17-18) Worker
14-15	(19-20) Smoking If item 19=7, and if item 20 is blank, then "1" was recorded in item 20.
16-17	(21-22) Recreation
18-19	(23-24) Relationships with others
Beginning with column 20 and ending with column 26 of card 3, the ranking of life priorities was recorded. The sequence for recording these items was as follows:	

ColumnsCoding

20	Education
21	Family
22	Job
23	Possessions
24	Recreation
25	Social
26	Spiritual

Beginning with column 27 and ending with column 77 of card 3, the computed sums of responses to the facets of self-concept and life style factors were recorded. These computed sums were generated by processing the raw data (columns 41 of card 1 through column 19 of card 3) with the SPSS (see Appendix M, Part II).

27-29	Computed sum of responses to "My Actual Self"
30-32	Computed sum of responses to "My Desired Self"
33-35	Computed sum of responses to "My Past Self"
36-38	Computed sum of responses to "My Present Self"
39-41	Computed sum of responses to "My Future Self"
42-44	Computed sum of responses to "My Family Life"
45-47	Computed sum of responses to "My Sex Life"
48-50	Computed sum of responses to "My Work Life"
51-52	Computed sum of responses to "Return to Job"
53-54	Computed sum of responses to "Sleep"
55-56	Computed sum of responses to "Diet"
57-59	Computed sum of responses to "Sex Life"
60-62	Computed sum of responses to "Parent"
63-65	Computed sum of responses to "Husband"

<u>Columns</u>	<u>Coding</u>
66-68	Computed sum of responses to "Smoking"
69-71	Computed sum of responses to "Worker"
72-74	Computed sum of responses to "Recreation"
75-77	Computed sum of responses to "Relationships with Others"
78-79	Blank
80	Code designating card 3 of data = 3

PART II  
RECODINGS AND COMPUTATIONS

## APPENDIX M, PART II

### RECODINGS AND COMPUTATIONS

A set of sample instructions for the execution of the recodings and computations involved in this investigation is detailed below. (All capital letters indicate the execution instructions for the computer. The length of instructions on each line is equivalent to the length of instructions on each separate card. Regular type indicates editorial comments).

DOCUMENT	THE TWO CARDS, MISSING VALUES AND ASSIGN MISSING, WERE DELETED FROM THIS RUN.
VARIABLE LIST	ID,SEX,TREAT,PHYS,MONEVENT,DAYEVENT,YR EVENT,MONPRES,DAYPRES,YRPRES,MONDCI,DAYDCI, YRDCI,BIRTH,DIAG,FREQ,WKDCI,ACT01 TO ACT13, DES01 TO DES13,PAS01 TO PAS13,PRE01 TO PRE13, FUT01 TO FUT14,FAM01 TO FAM13,SAX01, TO SAX13,WRK01 TO WRK13,LIFE01 TO LIFE09, LIFE10 TO LIFE24,EDUC,FAMILY,JOB,POSS,REC,SOC,SPIR
INPUT MEDIUM N OF CASES	CARD 43
INPUT FORMAT	FIXED(F4.0,2F1.0,11F2.0,F5.0,F1.0,F3.0, 3X,39F1.0/4X,75F1.0/ 4X,22F1.0)
RECODE	ACT01,ACT03,ACT05,ACT07,ACT09,ACT11,ACT13, DES02,DES04,DES06,DES08,DES10,DES12,PAS01, PAS03,PAS05,PAS07,PAS09,PAS11,PAS13,PRE02, PRE04,PRE06,PRE08,PRE10,PRE12,FUT01,FUT03, FUT05,FUT07,FUT09,FUT11,FUT13,FAM02,FAM04, FAM06,FAM08,FAM10,FAM12,SAX01,SAX03,SAX05, SAX07,SAX09,SAX11,SAX13,WRK02,WRK04WRK06, WRK08,WRK10,WRK12,LIFE03,LIFE05,LIFE06, LIFE08,LIFE11,LIFE12,LIFE13,LIFE15,LIFE17, LIFE20,LIFE22,LIFE23 (1=7) (2=6) (3=5) (4=4) (5=3) (6=2) (7=1)
RECODE	LIFE02 (1=8) (2=7) (3=6) (4=5) (5=4) (6=3) (7=2)
COMMENT	LIFE02=2 OR MORE MEANS THAT THE PATIENTS HAS RETURNED TO HIS JOB SINCE HIS CARDIAC EVENT. SUBSEQUENTLY THIS VARIABLE WILL BE IDENTIFIED AS RETJOB.
COMPUTE	ACTUAL=ACT01+ACT02+ACT03+ACT04+ACT05+ACT06+ ACT07+ACT08+ACT09+ACT10+ACT11+ACT12+ACT13



```

COMPUTE      DESIRED=DES01+DES02+DES03+DES04+DES05+
              DES06+DES07+DES08+DES09+DES10+DES11+DES12+
              DES13
COMPUTE      PAST=PAS01+PAS02+PAS03+PAS04+PAS05+PAS06+
              PAS07+PAS08+PAS09+PAS10+PAS11+PAS12+PAS13
COMPUTE      PRESENT=PRE01+PRE02+PRE03+PRE04+PRE05+PRE06+
              PRE07+PRE08+PRE09+PRE10+PRE11+PRE12+PRE13
COMPUTE      FUTURE=FUT01+FUT02+FUT03+FUT04+FUT05+FUT06+
              FUT07+FUT08+FUT09+FUT10+FUT11+FUT12+FUT13+FUT14
COMPUTE      FAMTOT=FAM01+FAM02+FAM03+FAM04+FAM05+FAM06+
              FAM07+FAM08+FAM09+FAM10+FAM11+FAM12+FAM13
COMPUTE      SEXTOT=SAX01+SAX02+SAX03+SAX04+SAX05+SAX06+
              SAX07+SAX08+SAX09+SAX10+SAX11+SAX13
COMPUTE      WORK=WRK01+02+WRK03+WRK04+WRK05+WRK06+WRK07+
              WRK08+WRK09+WRK10+WRK11+WRK12+WRK13
COMPUTE      RETJOB=LIFE01+LIFE02
COMMENT      RETJOB=1 MEANS THAT THE PATIENT HAS NOT
              RETURNED TO HIS JOB SINCE HIS CARDIAC EVENT.
COMPUTE      SLEEP=LIFE03+LIFE04
COMPUTE      DIET=LIFE05
COMPUTE      SEXLIFE=LIFE06+LIFE07+LIFE08+LIFE09
COMPUTE      PARENT=LIFE10+LIFE11+LIFE12
COMPUTE      HUSBAND=LIFE13+LIFE14+LIFE15+LIFE16
COMPUTE      SMOKING=LIFE19+LIFE20
COMPUTE      WORKER=LIFE17+LIFE18
COMPUTE      RECREAT=LIFE21+LIFE22
COMPUTE      RELATION=LIFE23+LIFE24
LIST CASES   CASES=43/VARIABLE=ALL/
WRITE CASES  (F4.0,2F1.0,11F2.0,F5.0,F1.0,F3.0,3X,39F1.0,
              '1'/F4.0,75F1.0,'2'/F4.0,22F1.0,8F3.0,3F2.0,
              7F3.0,2X,'3')
              ID TO PAS13,ID,PRE01 TO LIFE09,ID,LIFE10 TO
              RELATION
READ INPUT DATA

Place data cards here.

FINISH

```

PART III  
FREQUENCIES SUBPROGRAM FOR SUMMARY  
DESCRIPTIVE STATISTICS

## APPENDIX M, PART III

### FREQUENCIES SUBPROGRAM FOR SUMMARY DESCRIPTIVE STATISTICS

A set sample instructions for the execution of the SPSS subprogram, FREQUENCIES, as adapted for this investigation is detailed below. (All capital letters indicate the exact computer execution instructions. The length of instructions on each line is equivalent to the length of instructions on each separate card. Regular type indicates editorial comments.)

RUN NAME	FREQUENCIES, 2ND MEASURE, DELETING NONPARENTS 041,045,525,548 CONTR
DOCUMENT	THE TWO CARDS, MISSING VALUES AND ASSIGN MISSING, WERE DELETED FROM THIS RUN.
VARIABLE LIST	ID,PHASE, SEX,TREAT,PHYS,MONEVENT,DAYEVENT, YREVENT,MONPRES,DAYPRES,YRPRES,MONDCI, DAYDCI,YRDCI,BIRTH,DIAG,CONS,WKDCI,EXSES, EDUC,FAMILY,JOB,POSS,REC,SOC,SPIR,ACTUAL, DESIRED,PAST,PRESENT,FUTURE,FAMTOT,SEXTOT, WORK,RETJOB,SLEEP,DIET,SEXLIFE,PARENT, HUSBAND,SMOKING,WORKER,RECREATION,RELATIONSHIPS
INPUT MEDIUM	CARD
N OF CASES	17
INPUT FORMAT	FIXED(F3.0,3F1.0,11F2.0,F1.0,4X,F1.0, 2F3.0, 39X//19X,7F1.0,8F3.0,3F2.0,7F3.0)
PRINT FORMATS	ID(3)/PHASE TO TREAT(1)/MONEVENT TO BIRTH(2) /DIAG,CONS(1)/WKDCI,EXSES(3)/EDUC TO SPIR(1) /ACTUAL TO RELATIONSHIPS(3)SEXLIFE(0.28) PARENT(0,21) HUSBAND(0,28) SMOKING TO RELATION- SHIPS (0,14)
OPTIONS	3,8,9
STATISTICS	ALL
READ INPUT DATA	
	Place data cards here.
FINISH	

PART IV  
ANOVA SUBPROGRAM FOR ANALYSES OF COVARIANCE

## APPENDIX M, PART IV

### ANOVA SUBPROGRAM FOR ANALYSES OF COVARIANCE

A set of sample instructions for the execution of the SPSS subprogram, ANOVA, as adapted for this investigation is provided below. (All capital letters indicate the exact computer execution instructions. The length of instructions on each line is equivalent to the length of instructions on each separate card. Regular type indicates editorial comments).

```

RUN NAME          ANOVA DELETING NONHUSBAND 548
VARIABLE LIST     TREAT,ACTUAL,DESIRED,PAST,PRESENT,FUTURE,
                  FAMTOT,SEXTOT,WORK,RETJOB,SLEEP,DIET,SEXLIFE,
                  PARENT,HUSBAND,WORKER,SMOKING,RECREATION,
                  RELATIONSHIPS,COVACTUAL,COVDESIRED,COVPAST,
                  COVPRESENT,COVFUTURE,COVFAMTOT,COVSEXTOT,
                  COVWORK,COVRETJOB,COVSLEEP,COVDIET,COVSEXLIFE,
                  COVPARENT,COVHUSBAND,COVWORKER,COVSMOKING,
                  COVRECREATION,COVRELATIONSHIPS
INPUT MEDIUM     CARD
N OF CASES        50
INPUT FORMAT      FIXED (5X,F1.0//26X,8F3.0,3F2.0,7F3.0///
                  26X,8F3.0,3F2.0,7F3.0)

```

READ INPUT DATA

Place data cards here.

```

ANOVA             DIET BY TREAT (1,2) WITH COVDIET/
                  SEXLIFE BY TREAT(1,2) WITH COVSEXLIFE/
                  PARENT BY TREAT (1,2) WITH COVPARENT/
                  HUSBAND BY TREAT (1,2)WITH COVHUSBAND/
STATISTICS        1
ANOVA             ACTUAL BY TREAT(1,2) WITH COVACTUAL/
                  DESIRED BY TREAT(1,2) WITH COVDESIRED/
                  PAST BY TREAT(1,2) WITH COVPAST/
                  PRESENT BY TREAT (1,2) WITH COVPRESENT/
                  FUTURE BY TREAT(1,2) WITH COVFUTURE/
STATISTICS        1
ANOVA             FAMTOT BY TREAT(1,2) WITH COVFAMTOT/
                  SEXTOT BY TREAT(1,2) WITH COVSEXTOT/
                  WORK BY TREAT(1,2) WITH COVWORK/
                  RETJOB BY TREAT(1,2) WITH COVRETJOB/
                  SLEEP BY TREAT(1,2) WITH COVSLEEP/
STATISTICS        1

```

```
ANOVA          DIET BY TREAT(1,2) WITH COVDIET/
                SEXLIFE BY TREAT(1,2) WITH COVSEXLIFE/
                PARENT BY TREAT(1,2) WITH COVPARENT/
                HUSBAND BY TREAT (1,2) WITH COVHUSBAND/
STATISTICS     1
ANOVA          SMOKING BY TREAT(1,2) WITH COVSMOKING/
                WORKER BY TREAT (1,2) WITH COVWORKER/
                RECREATION BY TREAT (1,2) WITH COVWORKER/
                RELATIONSHIPS BY TREAT(1,2) WITH COVRELA-
                TIONSHIPS
STATISTICS     1
FINISH
```

APPENDIX N  
DETERMINATION OF POWER

## APPENDIX N

### DETERMINATION OF POWER

Power was determined in accordance with formulae and a table for the power of the F test found in Jacob Cohen's Statistical Power Analysis for the Behavioral Sciences.

Formulae:

$$m = p_1 m_1 + p_2 m_2$$

where:

$p_1 = 0.37$  (proportion of control subjects in total study population)

$p_2 = 0.63$  (proportion of experimental subjects in total study population)

$m_1 =$  mean associated with control group scores

$m_2 =$  mean associated with experimental group scores

Therefore,  $m = 0.37 m_1 + 0.63 m_2$

$$\sigma_m = \sqrt{0.37 (m_1 - m_2)^2 + 0.63 (m_2 - m)^2}$$

$\sigma$  = population standard deviations derived from a calculation of the total study population standard deviation



POWERS<sup>1</sup> OF VARIABLES

	<u>1st Measurement</u>	<u>2nd Measurement</u>
My Actual Self	37	17
My Desired Self	12	53
My Past Self	73	8
My Present Self	33	45
My Future Self	23	45
My Family Life	23	61
My Sex Life	37	12
My Work Life	12	23
Return to Job	41	45
Sleep	13	15
Diet	96	6
Sex Life	45	30
Parent	65	8
Husband	65	61
Smoking	98	33
Worker	12	8
Recreation	49	45
Relationships	8	30
Overall Power		35

<sup>1</sup>Based on Table 8.3.12, Power of F test at  $\alpha = 0.05$ ,  $\mu = 1$ ,  $n = 52$ , on pages 304-305 of Jacob Cohen, Statistical Power Analysis for the Behavioral Sciences (1969).

APPENDIX O

RANK ORDER CORRELATION STUDY:

TIME LAPSE DCI ENTRY DATE TO CONSENT DATES

RANK ORDER CORRELATION STUDY:  
TIME LAPSE DCI ENTRY DATE TO CONSENT DATES

The time lapse between a patient's entry into the Dallas Cardiac Institute treatment program and the date he was first assessed in this investigation posed threats to the internal validity of the study. Dates that the patient actually completed the first assessment were not available; however, all patients had their authorization forms to participate in this study dated. This latter date, the date indicated on the "Authorization for the Release of Medical Records for Research Purposes," was considered the best approximation to the date of their first assessment. The time lapse between the patient's enrollment date in the DCI and the date on the authorization form was converted to days.

The nonparametric statistical procedure, the Spearman Rank Correlation Technique, was employed to compare the rank order of time lapse (in days) with scores on each of the variables.

<u>ID</u>	<u>DATE ENTERED DCI</u>	<u>DATE CONSENT SIGNED</u>	<u>TIME LAPSE (IN DAYS)</u>
001	4/ 5/77	11/ 4/77	213
002	10/11/77	11/ 4/77	24
003	1/12/76	11/ 4/77	661
006	9/28/77	11/ 8/77	41
007	3/ 3/76	11/ 7/77	614
010	4/13/76	11/ 4/77	570
011	7/24/75	11/ 4/77	833
012	5/ 4/77	11/ 4/77	184
013	5/ 2/75	11/ 7/77	916
014	3/ 4/77	11/ 8/77	249
017	5/31/77	11/ 8/77	161
018	8/10/76	11/ 7/77	454
019	2/14/77	11/ 7/77	266
021	9/23/74	11/ 8/77	1411
022	9/ 7/77	11/ 5/77	271
023	11/ 3/77	11/ 7/77	4
028	1/29/75	11/ 9/77	1015
029	11/17/75	11/ 4/77	719
031	6/21/77	12/ 5/77	167
032	11/12/77	11/23/77	11
033	11/30/76	12/11/77	11
036	12/20/77	1/ 5/78	15
037	11/14/77	11/21/77	7
038	12/13/77	1/ 5/78	22
039	1/25/78	1/25/78	1
040	12/21/77	2/11/78	41
041	1/14/78	2/ 1/78	18
042	1/14/78	2/14/78	31
043	2/14/78	2/15/78	1
044	1/30/78	2/15/78	16
045	2/13/78	2/15/78	2
047	2/20/78	3/17/78	25

Computation using the Spearman Rank Correlation  
 Technique was accomplished with the SPSS Subprogram,  
 NONPAR CORR. The sequence of IBM control cards for this  
 procedure was set up as follows:

RUN NAME	RANK ORDER CORRELAT BETWEEN TIME PRIOR TO 1ST MEASURE AND 1ST MEA
VARIABLE LIST	ID, DAY, ACTUAL, DESIRED, PAST, PRESENT, FUTURE, FAMTOT, SEXTOT, WORK, RETJOB, SLEEP, DIET, SEXLIFE, PARENT, HUSBAND, WORKER, SMOKING, RECREATION, RELATIONSHIPS
COMMENT	DAY IN THE VARIABLE LIST REFERS TO THE NUMBER OF DAYS THE PATIENT HAD BEEN IN THE DALLAS CARDIAC INSTITUTE MEDICALLY SUPERVISED GROUP EXERCISE PROGRAM. DAY IS THE DIFFERENCE BETWEEN THE DATE THE PATIENT ENROLLED IN DCI AND THE DATE HE PLACED ON THE CONSENT FORM TO PARTICIPATE IN THIS INVESTIGATION.
INPUT MEDIUM	CARD
N OF CASES	32
INPUT FORMAT	FIXED(F3.0, 2X, F4.0, 17X, 8F3.0, 3F2.0, 7F3.0)
LIST CASES	CASES=32/VARIABLES=ALL/
NONPAR CORR	ACTUAL TO RELATIONSHIPS WITH DAY
OPTIONS	1, 6
READ INPUT DATA	

Place data deck here

FINISH

/\*

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