## INFORMATION TO USERS

While the most advanced technology has been used to photograph and reproduce this manuscript, the quality of the reproduction is heavily dependent upon the quality of the material submitted. For example:

- Manuscript pages may have indistinct print. In such cases, the best available copy has been filmed.
- Manuscripts may not always be complete. In such cases, a note will indicate that it is not possible to obtain missing pages.
- Copyrighted material may have been removed from the manuscript. In such cases, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, and charts) are photographed by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is also filmed as one exposure and is available, for an additional charge, as a standard 35mm slide or as a 17"x 23" black and white photographic print.

Most photographs reproduce acceptably on positive microfilm or microfiche but lack the clarity on xerographic copies made from the microfilm. For an additional charge, 35mm slides of 6"x 9" black and white photographic prints are available for any photographs or illustrations that cannot be reproduced satisfactorily by xerography.

**Black, Mary McAnear**

# CHANGES IN BODY WEIGHT AND SERUM LIPID LEVELS IN LOW, MODERATE, AND HIGHLY COMPETITIVE MALE PARTICIPANTS OF A CARDIAC REHABILITATION PROGRAM

*The University of North Carolina at Greensboro* PH.D. 1986

# CHANGES IN BODY WEIGHT AND SERUM LIPID LEVELS IN LOW, MODERATE, AND HIGHLY COMPETITIVE MALE PARTICIPANTS OF A CARDIAC REHABILITATION PROGRAM

by

Mary McAnear Black

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1986

Approved by

Dissertation Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Adviser Allen C. Magee

Committee Members Barbara Clawson

Karen L Graves

Elizabeth L Schiller

Hugh Sagamon

March 24, 1986
Date of Acceptance by Committee

March 24, 1986
Date of Final Oral Examination

BLACK, MARY MCANEAR, Ph.D. Changes in Body Weight and Serum Lipid Levels in Low, Moderate, and Highly Competitive Male Participants of a Cardiac Rehabilitation Program. (1986)
Directed by Dr. Aden C. Magee. 53 pp.

Fifty-eight white, married, nonsmoking male participants of the Greensboro Cardiac Rehabilitation Program were divided into low (Group I), moderate (Group II), and highly competitive (Group III) groups based on their percentile scores on the "H" (hard driving and competitive) scale of the Jenkins' Activity Survey. The purpose of the study was to determine if a relationship existed between the "H" scale test scores and changes in subjects' body weight and serum lipids within the first six months of program participation. Data on body weight, serum cholesterol, high density lipoprotein cholesterol (HDL-cholesterol), and triglycerides were collected upon admission and six months after admission. No statistically significant differences were found at six months between the three groups for any of the dependent variables when analyzed via analysis of covariance. Trends were noted, however, in that the adjusted mean changes in total cholesterol and triglycerides six months into the program tended to decrease in the moderate and highly competitive groups and increase in the noncompetitive group.

No trends were noted in the mean changes of percent ideal body weight or HDL-cholesterol levels. It was concluded that a lack of significant results may have been due to a large amount of variability among the dependent measures and, therefore, further study using a much larger sample size is warranted.

ACKNOWLEDGMENTS

The author wishes to express sincere appreciation to Dr. Aden Magee, major professor, for all his support and guidance throughout the course of graduate study and this research. A special thank you is also extended to committee members, Drs. Karen L. Graves, Elizabeth L. Schiller, Barbara Clawson, and Hugh Hagaman for all their constructive evaluation of this research. Gratitude is expressed to Judy Lipinski, Statistical Consultant at the University of North Carolina at Greensboro, for all her patient assistance in data analysis. Special thanks also goes to Jan Poole for typing the dissertation.

This study would not have been possible without the cooperation of the Greensboro Cardiac Rehabilitation Program; the Program Director, Nancy Huber, R.N., M.P.H.; the Office Manager, Judy Glasgow; and the program participants who were used as subjects. The participants in this program were what gave me purpose to pursue this study.

A very special thank you goes to my parents, Frank and Elizabeth McAnear, who instilled in me a strong desire to achieve and who never stopped believing in me. My deepest gratitude goes to my husband, Robert Henry, for all his love, encouragement, and endless support, and to my precious three-year-old, Elizabeth Kathleen, who kept me smiling throughout this endeavor.

TABLE OF CONTENTS

Page

APPENDICES

LIST OF TABLES

# CHAPTER I

## INTRODUCTION

The primary goal of the health care team in a cardiac rehabilitation program is the elimination of all possible risk factors which may further the progression of heart disease. Smoking, heredity, age, male gender, physical inactivity, and diabetes are well-known risk factors for heart disease. Hypertension, obesity, and elevated serum lipids are the major diet-related risk factors. Other possible heart disease risk factors are currently being researched; one of which is a psychological variable known as the coronary-prone behavior pattern.

Research has established that heart disease is more likely to occur in individuals exhibiting a specific type of behavior known as the coronary-prone or "Type A" behavior pattern (Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975). "Pattern A" subjects have been found to have greater atherosclerotic obstruction than the "Pattern B" or noncoronary-prone subjects (Zyzanski, Jenkins, Ryan, Flessas, & Everist, 1976). Multivariate analysis of the data derived from the Western Collaborative Group study (Rosenman et al., 1975) indicated the risk of heart disease was enhanced by both a "Type A" behavior pattern and other risk factors. The "Type A" pattern was independently a significant pathological variable. Subjects tested as "Type A" individuals were found to exhibit twice the risk as "Type B" individuals for clinical coronary heart disease and five times the risk of having a second myocardial infarction.

In view of the studies cited linking behavior "Pattern A" with an increased risk of heart disease, it is understandable why "Pattern A" is looked upon in a negative sense. None of the studies cited, however, involved subjects participating in a cardiac rehabilitation program.

"Pattern A" is said to be "a coping style aimed at asserting and maintaining control over potentially uncontrollable situations" (Burnam, Pennebaker, & Glass, 1975). Having a myocardial infarction may be perceived by "Type A" patients as an uncontrollable situation and an impediment towards achieving preset goals in life. It is likely that any risk factors possessed by the patient would also be viewed as a threat to achieving in life. "Type A" patients, therefore, may be challenged to work hard at reducing their risk factors in order to gain greater control over the progression of their heart disease. The "Type B" patient may not view risk factors as an impediment towards achieving set goals since by nature he is not as competitive and achievement oriented as the "Type A" patient. Thus, a "Type B" patient may not be as challenged to reduce his risk factors.

As a nutritionist for a cardiac rehabilitation program, the investigator has observed that cardiac patients of a highly competitive nature tend to be more aggressive in their efforts to decrease body weight and serum lipids. Thus, the competitive behavior typical of the "Type "A person may serve as a positive factor in decreasing major risk factors.

The purpose of this research was to explore this observation in an objective manner via a retrospective ex post facto study. If a competitive nature proves to be a desirable characteristic in terms of lowering risk factors, future research may then be warranted to determine how noncompetitive "Type B" patients may be motivated to reduce their risk factors.

## Assumptions

In order to conduct this study the following assumptions were made prior to data collection:

1. All subjects were capable of understanding the goals and life style alterations recommended to them to make the needed changes in weight and serum lipid levels, since all subjects had at least attended high school and were given a thorough dietary instruction.
2. Alcoholic beverage intake did not change significantly during the first six months of participation in the rehabilitation program.
3. Subjects were honest in reporting their smoking status and did not smoke during the first six months of participation in the Cardiac Rehabilitation Program.
4. No beta-blocker medication changes occurred in the subjects during the first six months of participation in the rehabilitation program.

# CHAPTER II

## REVIEW OF LITERATURE

Contrary to the studies which portray "Pattern A" in a negative light, Carver, DeGregoris, and Gillis (1981) found it to have some beneficial aspects with respect to intercollegiate athletes. "Type A" intercollegiate football players have been rated by their coaches to work harder on the field with physical injuries than injured "Type B" players. This is a characteristic looked upon favorably by coaches even though it may not be in the best interest of the player. No significant differences in performance were noted between the "Type A" and "Type B" players prior to the game season, yet significant differences were noted between injured players. Carver et al. concluded that injuries may have been looked upon by the "Type A" players as an impediment to achievement and they, therefore, worked harder toward achievement. This study supports Jenkins' (1978) description of "Type A" behavior in that the predisposition for "Type A" behavior exists, but the actual behavior is not exhibited until a perceived challenge presents itself.

In the past, researchers have looked at the psychological factors associated with the onset and recurrence of heart disease. However, current research, albeit limited, is beginning to focus on the effect "Pattern A" has on the reduction of risk factors within a rehabilitation program setting. A recent study by Rejeski, Morley, and Miller

(1984) observed that "Pattern A" behavior appeared to be a positive aspect within the rehabilitation program setting. Fifty-seven white male participants in the Wake Forest University Cardiac Rehabilitation Program were used in a descriptive prospective study. The purpose of the study was to determine the relationship between "Type A" and "Type B" personality profiles of cardiac patients and their compliance to a prescribed exercise regimen. Attendance at the three day a week exercise program, the intensity of the exercise, and the increase in the maximum exercise tolerance (MET) level that occurred over a three-month period were the dependent variables correlated with the presence of a "Type A" or "Type B" personality profile. Results obtained via canonical correlation demonstrated that those participants with a "Type A" personality profile exercised with greater intensity than those with low scores. Greater improvement in MET capacity was subsequently found in the "Type A" individuals.

The fact that the "Type A" subjects apparently exercised with greater intensity than the "Type B" subjects may be due to the aggressive and competitive personality characteristic often seen in "Type A" individuals. The greater improvement in MET capacity may have been due to the fact that the "Type A" individuals worked harder during exercise and subsequently became stronger. Since "Type A" individuals are generally characterized as hard-driving and competitive in nature, they may have competed against themselves or others and, therefore, exercised harder. Thus, a greater improvement in MET capacity was found in the "Type A" subjects.

Since a difference in exercise intensity and MET capacity was observed in "Type A" and "Type B" personalities, there is the possibility that similar differences may be expected with respect to body weight and serum lipids. These indices would be likely to drop more significantly in the "Type A" patients simply because they exercise more regularly and more intensely, and thus expend more calories. "Type A" subjects may also follow a prescribed diet more rigidly, and a greater reduction in body weight and serum lipids may be seen.

In general, the past research on "Pattern A" behavior has looked at the total pattern as a whole rather than its individual components such as competitive drive, job involvement or speed and impatience. Since an individual may be classified as "Type A" without possessing all of the stereotyped characteristics, it is possible that only one of the components may be a significant heart disease risk factor. A study conducted by Matthews, Glass, Rosenman, and Bortner (1977) proposed that only one or two components were significantly associated with heart disease as opposed to an overall "Type A" rating. To test this hypothesis, 186 subjects were selected from the 3,000 male participants in the Western Collaborative Group Study. Each subject was matched for age and place of employment to two control subjects. A personal interview was conducted with each subject to assess the presence of "Pattern A." The interview consisted of five subsets characteristic of "Pattern A"--competitive drive, past achievement, impatience, nonjob involvement, and speed. Interview ratings analyzed by factor analysis revealed that only competitive drive and impatience were significantly associated with the later onset of coronary heart

disease. Yet, these two indices may have a positive influence during the rehabilitation process.

Research within a cardiac rehabilitation program setting was conducted by Rejeski, Morley, and Miller (1983) using the Jenkins' Activity Survey which is a written test based on the structured interview method of testing for the presence of "Pattern A." The authors were seeking to determine if "Type A" behavior was related to psysiological strain as measured by the respiratory exchange ratio ($RER_{max}$) at the end of a graded exercise treadmill test. As a second objective, the authors explored the relationship between the scores on the four subscales of the Jenkins' Activity Survey (job involvement, hard driving and competitiveness, speed and impatience, and overall "Type A"), the $RER_{max}$, and the rating of perceived exertion measured by the Borg scale. The data analyzed via multivariate analysis revealed that the "Type A" patients worked harder on the treadmill test. Additionally, those "Type A" patients scoring high on the job involvement subscale were found to have exerted significantly greater effort on the treadmill test than the "Type A" patients scoring high on the other subscales. These same patients were also found to suppress fatigue while on the treadmill. A plausible explanation for the results are that the "Type A job involved" subjects may have felt that their heart disease endangered their employment opportunities, and they, therefore, worked harder to ensure their recovery. In proving that they are strong and healthy, they may be so motivated that they suppress fatigue and even pain while exercising.

A thorough review of the literature did not yield any studies regarding the effect "Pattern A" or any other psychological measure has on body weight and serum lipids. Yet, in view of the study by Rejeski et al. (1983), it may, therefore, be suspected that the higher the job involvement score on the Jenkins' Activity Survey, the greater the reduction in body weight and serum lipids. The investigator of this study, however, postulates that the hard driving and competitive score is the subscale of most significance in dealing with lowering body weight and serum lipid levels. This is due in part to the investigator's feeling that if a person is highly involved in his job he probably has a highly competitive personality. Additionally, the investigator has observed that regardless of job orientation, highly competitive cardiac patients tend to be more aggressive than noncompetitive patients in their efforts to diet and exercise. A greater decrease in body weight and serum lipids would, therefore, be expected in the competitive patients.

In order to test this theory, the investigator designed a retrospective ex post facto study entitled "Changes in Body Weight and Serum Lipid Levels in Low, Moderate, and Highly Competitive Male Participants of a Cardiac Rehabilitation Program." The purpose of this study was to determine if a relationship existed between test scores for a hard driving and competitive personality trait and changes in body weight and serum lipids in male participants of a cardiac rehabilitation program.

# CHAPTER III

# METHODS AND PROCEDURES

The purpose of this investigation was to determine the relationship between a competitive personality trait in male cardiac patients and changes in their risk factors for heart disease. More specifically, the investigator wished to determine whether cardiac patients with a low, moderate, or highly competitive personality achieve greater, lesser, or similar changes in body weight and serum lipids while participating in a cardiac rehabilitation program.

## Research Design

Since personality traits are inherent in individuals and cannot be manipulated, the random assignment of subjects to groups was not possible. Thus, an ex post facto design was used since it was not possible to control the independent variable.

## Setting

The study was conducted using male participants of the Greensboro Cardiac Rehabilitation Program, a medically supervised exercise program that meets for one hour three times a week. All program participants are required to attend 75% of the exercise sessions each month. The program has an interdisciplinary approach in which the physician, nurse, dietitian, exercise physiologist, psychologist, vocational rehabilitation counselor, and the patient work together as a team to

rehabilitate the cardiac patient. All subjects used in this study were admitted into the program between January 1981 and January 1984. Each subject was referred to the program by his cardiologist with a diagnosis of one or more of the following: angina, coronary artery disease (CAD), myocardial infarction (MI), or coronary artery bypass graft (CABG) surgery.

## Identification of Variables

Independent variable. The independent variable was competitive personality trait as measured by the subjects' percentile scores on the "H" (hard-driving and competitive) scale obtained from the Jenkins' Activity Survey (Jenkins et al., 1979). Based on these scores, the subjects were divided into three groups. Group I was made up of subjects considered to exhibit little or no competitive behavior. Subjects in this group scored between the 1st and 34th percentile. Group II, subjects of moderate competitiveness, scored between the 35th and 66th percentile. Group III consisted of highly competitive individuals scoring in the 67th to 100th percentile.

Dependent variables. The dependent variables were body weight change and serum lipid change during a six-month period of time. The serum lipids studied were total cholesterol, high density lipoprotein cholesterol (HDL-cholesterol), and triglycerides. The goal for patients in a cardiac rehabilitation program is to decrease total cholesterol to 220 mg/dl or less, decrease triglycerides to 160 mg/dl or less, increase HDL-cholesterol to 45 mg/dl or more, and attain and maintain their ideal body weight.

## Target Population

The target population was all white, married, nonsmoking cardiac patients with at least a high school education who were enrolled in the Greensboro Cardiac Rehabilitation Program.

## Sample Population

From an initial screening of the patients' medical records, 71 potential subjects were identified. Of this number, five did not return a signed consent form even after a second mailing and a follow-up phone call. Six of the potential subjects confessed to having smoked during the time of the study and were, therefore, eliminated. Two additional subjects were eliminated due to an ethanol intake which exceeded two ounces per day. The remaining 58 subjects served as the sample population which consisted of white, married, nonsmoking, male cardiac patients with a high school education or greater. Of the 58 subjects, 31 had been hospitalized for an MI but had not had angioplasty or CABG surgery. Nine subjects had recently had CABG surgery in order to prevent an MI but had never had an MI. Nine other subjects had had both an MI and bypass surgery. Only four subjects had been diagnosed with CAD alone, two with angina only, and one with both CAD and angina. Many of the subjects had hypertension, yet it was not included formally in their diagnoses. Therefore, the exact number of subjects with hypertension was not known. The blood pressures of all subjects were either normal or controlled with medication. Excluded from the initial screening were subjects with diabetes, familial hyperlipoproteinemia, or a psychological disorder requiring ongoing psychological treatment.

Two values for triglycerides at baseline and one value post six months were eliminated because they were so high they skewed the distribution (515 mg/dl, 428 mg/dl, and 339 mg/dl). Three values were missing for HDL-cholesterol at baseline and one post six months. No other values were missing or eliminated.

## Informed Consent

Consent was obtained from the Greensboro Cardiac Rehabilitation Program prior to the conduction of this investigation. Each subject was then mailed a consent form which he returned prior to data collection. The consent form (see Appendix A) included an explanation of the study, the data to be collected, and the risks and benefits of participating in the study. Subjects were informed that all information would be treated as confidential and that they were free to withdraw from the study at any time without penalty or prejudice. To further ensure the safety of the subjects, the investigator obtained approval for this study from the Human Subjects Review Committee of the University of North Carolina at Greensboro.

## Instrumentation

The Jenkins' Activity Survey was the instrument used to divide the subjects into a high, medium, or low group for a competitive personality. It is a self-administered, pencil-and-paper questionnaire used to measure the coronary-prone behavior pattern in individuals. It is not a measure of activity as the name implies, nor is it a measure of stress. The test questions are multiple choice with three to five possible answers relating to the frequency (frequently, occasionally,

almost never) a certain "Type A" behavior occurs. Form C is the 5th edition of the Jenkins' Activity Survey published for the clinical community.

The Jenkins' Activity Survey consists of four subscales, each of which have a separate percentile score. The "Type A" scale ("A" scale) measures the multifactorial construct of the coronary-prone behavior pattern. Three other factorially independent components of the coronary-prone behavior pattern are measured: speed and impatience ("S" scale), job involvement ("J" scale), and hard driving and competitiveness ("H" scale). Only the percentile scores for the "H" (hard driving and competitive) scale were used for this study since the investigator felt this to be a major factor in determining a risk factor change among cardiac patients.

The Jenkins' Activity Survey is suitable for use with adults who can read on at least the 8th-grade level. No testing was done to determine the level at which each subject could read, but all subjects participating in this study had attended high school. Most subjects completed the 52-item questionnaire within 20 minutes. All subjects took the test under the direct supervision of the staff psychologist. All scoring was done by the staff psychologist.

Both internal consistency and test-retest reliability estimates were computed for the Jenkins' Activity Survey questionnaire. The reliability coefficients derived for internal consistency by Kendall's tau b test-retest coefficient and by the squared multiple correlation (SMC) were .83 and .85 (Jenkins, Zyzanski, & Rosenman, 1979). The test-retest coefficients ranged from .65 to .82 (Jenkins et al., 1979)

when given at a four- to six-month interval. These results are similar to the reliabilities of other standardized psychological tests.

The Jenkins' Activity Survey is reported to be a valid, as well as a reliable, instrument. Scores obtained from the Jenkins' Activity Survey were found to agree with the ratings from a structured interviewer observing "Type A" behavior in the same individuals (Jenkins et al., 1979). The questionnaire consists of items which distinguished "Type A" behavior from "Type B" behavior as observed in the structured interview. Additionally, numerous studies have established that the more "Type A" behavior that is present, as measured by the Jenkins' Activity Survey, the greater the risk of coronary heart disease (Jenkins et al., 1979). Therefore, the Jenkins' Activity Survey is said to be a valid instrument in that it measures what it is supposed to measure, "Type A" behavior.

## Data Collection

Medical (diagnosis, medications), social (education, work status, smoking status, ethanol intake), anthropometric (height, weight), biochemical (total cholesterol, HDL-cholesterol, triglycerides), and psychological data were obtained from the medical chart at the Cardiac Rehabilitation Program. All of the data needed for the investigation were collected on a data collection form (Appendix B) designed by the investigator.

Social data. The subjects' level of education (completed all or part of high school, technical college, college, or a master's or doctorate), work status (employed, unemployed, disabled, or retired)

and ethanol intake were taken from the diet history form completed by the subject upon admission to the program. Subjects either drank alcoholic beverages in moderation (2 ounces of ethanol or less per day) or they did not drink at all. No account was made for the number of days per week that they drank. However, any subject who drank more than two ounces per day was eliminated from the data analysis due to the elevating effect of alcohol on triglyceride levels. No attempt was made to correlate alcohol intake with the change in weight or serum lipids. The information was only collected to determine any prior differences in alcohol intake between the three groups. The smoking status (quit or never smoked) was taken from the medical history form. Any subject who was smoking cigarettes, cigars, or pipes upon admission to the program was eliminated from the study.

Anthropometric data. Height and weight were the only anthropometric measurements available in the medical charts. All subjects recorded their own weekly weights with exercise clothing and shoes on. Weights were recorded the same day of each week prior to the exercise session using the same scale (Healthometer Balance Beam Scale). However, no difference in weight was allowed for the differences in clothing that probably occurred with the change of seasons. The actual data collected were two single values; the weight on the day of admission and the weight on the last exercise day of the month six months later.

Height was recorded by the subject on the day of admission to the program. The ideal body weight for all subjects was calculated by the investigator using the subjects' height and the standard formula

recommended by the American Dietetic Association and the American Diabetes Association (1977). Using the ideal body weight (IBW) and the actual body weight (ABW), the percent of ideal body weight each subject weighed on admission and six months after admission were calculated.

Serum lipids. Total cholesterol, high density lipoprotein cholesterol, and triglycerides were obtained from blood samples collected at individual cardiologist's offices and analyzed in the laboratory routinely used by the cardiologist. Results were sent from the cardiologist to the Cardiac Rehabilitation Program. Even though all the blood samples of subjects were not analyzed by the same laboratory, each subject had the same physicians' office and laboratory collect and analyze their blood for both the admission and six-month evaluations. Since the subjects were being used as their own controls in a sense, the investigator felt this would not pose a problem in the data analysis.

Psychological data. All subjects completed the Jenkins' Activity Survey as part of the routine admission evaluation of participants in the Cardiac Rehabilitation Program. The "H" (hard driving and competitive) scale from the Jenkins' Activity Survey was the only psychological measurement used in this investigation. In addition to psychological testing, the staff psychologist conducted a personal interview with each subject and reported the findings of the testing to the subjects. Any subject found to need ongoing psychological treatment was eliminated from the study. The Jenkins' Activity Survey was completed by the subjects once at the time of admission.

Additional Background Information

A seven-day food diary, kept by all program participants upon admission to the program, was used by the staff dietitian for counseling purposes. Since the patients recorded their food consumption with varying degrees of accuracy, and portion sizes were only estimated by the patients, this information was believed to be too inaccurate for research purposes. All subjects were, however, instructed on a fat modified, 3-4 gram sodium, "no sugar added" diet upon admission to the program.

No more than 30% of the total kilocalories were to be from fat and a polyunsaturated to saturated ratio (P/S ratio) of 2 to 1 was recommended. Caloric recommendations were individualized according to the patient's need to lose, gain, or maintain his weight. If weight loss was needed, caloric levels were recommended for a weight loss of 1-2 pounds per week. Recommendations were made to increase skim milk, fruit, vegetable, and whole grain intake based on evaluation of the seven-day food record. Subjects were instructed to limit caffeine intake to no more than the equivalent of three cups of coffee per day. Alcohol intake was recommended to be no more than two ounces of ethanol per day.

The admission laboratory data were explained to each subject and his spouse during an hour-long private dietary consultation session. At that time dietary goals were set according to the patient's needs. At three- and six-month intervals, all subjects repeated their laboratory tests. A follow-up consultation was done by the dietitian at which time all new laboratory test results and changes in body weight

were discussed. Each subject was informed of what progress had been made and what goals needed to be achieved.

Data Analysis

Pearson's correlation coefficient was used to determine any existing correlation between the hard driving and competitive scores on the Jenkins' Activity Survey and the dependent variables at baseline. The coefficients for total cholesterol, HDL-cholesterol, triglycerides, and percent ideal body weight were 0.07, -0.22, 0.12, and 0.02, respectively. No correlation was, therefore, found to be present. A second correlation analysis was done to see if the variables related to one another at baseline. All of the variables appeared to have a low to moderate correlation with total serum cholesterol ($r$ = .21 for HDL-cholesterol, $r$ = .31 for triglycerides, $r$ = .28 for percent ideal body weight) as shown in Table D-1, Appendix D, but they were not related to each other. The variables were, therefore, not considered to be redundant. A third correlation was computed on the change in the variables during the six months (see Table D-2, Appendix D). No correlation was found between a change in HDL-cholesterol and a change in triglycerides ($r$ = 0.00). Nor was any correlation found between a change in HDL-cholesterol and a change in percent ideal body weight ($r$ = .04). Moderate correlations were found between a change in HDL-cholesterol and a change in total cholesterol ($r$ = .45); a change in triglycerides and a change in total cholesterol ($r$ = .38); and a change in percent ideal body weight and a change in total cholesterol ($r$ = .41). A low to moderate correlation was found between a change

in percent ideal body weight and a change in triglycerides ($r$ = .30). The changes in the dependent variables made within six months were considered to be unrelated to one another.

Data were analyzed via analysis of covariance to see if a change in body weight and serum lipids differed significantly between highly competitive, moderately competitive, and noncompetitive male subjects within the first six months of program participation. Four separate analyses were done for each of the dependent measures. Each subject's baseline score was the covariate and the dependent variable was the change in percent ideal body weight, total cholesterol, HDL-cholesterol, and triglycerides that occurred post six months. The data for this study was analyzed using the General Linear Model (GLM) procedure of the Statistical Analysis System (SAS) (Helwig & Council, 1979).

# CHAPTER IV

# RESULTS AND DISCUSSION

## Characteristics of the Groups

Subjects were divided into one of three groups based on their percentile score on the "H" (hard driving and competitive) scale of the Jenkins' Activity Survey. Group I, the noncompetitive group with scores ranging in the 0-33rd percentile consisted of 18 subjects. Group II, the moderately competitive group with scores ranging in the 34th-66th percentile consisted of 22 subjects. Eighteen subjects were in Group III, the highly competitive group, with scores ranging in the 67th-100th percentile.

The average age for Groups I, II, and III were 54, 53, and 57, respectively. As shown in Table 1, all three groups were similar with regard to educational status and the number of employed, unemployed, and retired individuals within each group. None of the subjects was receiving disability benefits. Smoking status was also similar among the groups with 1, 6, and 0 subjects who never smoked in Groups I, II, and III, respectively. All the other subjects had quit smoking before entering the cardiac program, usually the day their heart disease was diagnosed. There were no major differences between the groups in the mean percent of ideal body weight when patients began the program (Table 2). Mean serum lipid levels (Table 2) demonstrated similarities among groups at baseline with the exception of serum triglycerides.

Table 1

Demographic Data of all Groups at Baseline

| Group | Average Age (years) | Education | | | | Work Status | | |
|---|---|---|---|---|---|---|---|---|
| | | High School (no.) | Technical Institute (no.) | College (no.) | Advanced Degree (no.) | Employed (no.) | Unemployed (no.) | Retired (no.) |
| I ($n$ = 18) | 55 | 11 | 0 | 6 | 1 | 13 | 1 | 4 |
| II ($n$ = 22) | 53 | 10 | 0 | 9 | 3 | 14 | 6 | 2 |
| III ($n$ = 18) | 57 | 7 | 1 | 7 | 3 | 9 | 3 | 6 |

Table 2

Anthropometric and Biochemical Data of All Groups at Baseline

| Groups | Mean Body Wt. (lbs.) | Mean IBW (lbs.) | Mean % of IBW[a] | Serum Lipids | | |
|---|---|---|---|---|---|---|
| | | | | Mean TCHOL[b] (mg/dl) | Mean HDL-C[c] (mg/dl) | Mean Trigly.[d] (mg/dl) |
| I ($n$ = 18) | 183 | 173 | 105 | 218 | 37 | 176 |
| II ($n$ = 22) | 180 | 170 | 106 | 229 | 35 | 159 |
| III ($n$ = 18) | 178 | 169 | 105 | 225 | 33 | 197 |

[a]IBW - ideal body weight

[b]TCHOL - total cholesterol

[c]HDL-C - high density lipoprotein cholesterol

[d]Trigly. - triglycerides

Individuals in Group III had triglyceride levels which were 38 mg/dl higher than those in Group II where serum triglycerides were within the normal range (10 mg/dl-160 mg/dl) at baseline. This difference was not thought to be due to alcoholic beverage intake because the subjects all drank in moderation except for 7, 8, and 5 nondrinkers in Groups I, II, and III, respectively.

Results

The means for the changes in percent ideal body weight and serum lipids that occurred within six months were adjusted to account for the differences between the groups at baseline using the least squares mean (see Table 3). The data analyzed via analysis of covariance to see if the change in body weight and serum lipids differed significantly in any one of the three groups are presented in Tables D-3, D-4, D-5, and D-6, Appendix D. No group had a significantly greater change in the percent of ideal body weight or in any of the serum lipids measured (total cholesterol, HDL-cholesterol, and triglycerides).

Trends were noted, however, in that a nonsignificant decrease in the adjusted means for the change in total cholesterol were found in the moderate (Group II) and highly competitive (Group III) groups by approximately 4 mg/dl and 9 mg/dl, respectively (see Table 3). In comparison, a nonsignificant increase of approximately 15 mg/dl was found in the noncompetitive group (Group I). Trends were also noted in the adjusted means for changes in serum triglycerides. Group I showed a slight increase of 2 mg/dl; whereas, Group III showed a decrease by approximately 16 mg/dl. Group II, the moderately competitive group, showed the greatest change, although nonsignificant, of approximately 30 mg/dl. No trends were noted among the groups with regard to the changes in HDL-cholesterol or percent ideal body weight.

Table 3

Adjusted Means for Changes in Percent Ideal Body Weight and Serum Lipids of Groups Within Six Months

| Dependent Measures | Group I | Group II | Group III | Significance of F Value |
|---|---|---|---|---|
| Mean Change in Total Cholesterol (mg/dl) | 15.23 | - 4.18 | - 8.68 | NS |
| Mean Change in HDL-Cholesterol (mg/dl) | 1.26 | .22 | - 0.53 | NS |
| Mean Change in Triglycerides (mg/dl) | 1.49 | -29.72 | -15.64 | NS |
| Mean Change in Percent Ideal Body Weight | 0.41 | - 0.33 | - 0.37 | NS |
| | n=18 | n=22 | n=18 | |

Note: NS = a nonsignificant F value

## Discussion

No statistically significant differences were found among the three groups regarding the changes that occurred within six months on any of the dependent measures (total cholesterol, HDL-cholesterol, triglycerides, and percent ideal body weight). The standard deviations and ranges for serum lipids (see Tables C-3, C-6, and C-9, Appendix C) and percent ideal body weight (see Tables C-2, C-5, and C-8, Appendix C) at baseline and post six months showed a large amount of variability. It is, therefore, not surprising that no statistically significant differences were found. Trends were noted, however, in that the moderately competitive and highly competitive groups showed a

slight decrease in the adjusted means for total cholesterol and triglycerides; whereas, the noncompetitive group showed a slight increase. Significant differences among the groups on these two variables might well have been found had a larger sample size been used to account for the large variability present.

No significant change or trend was found for percent ideal body weight at six months for any of the groups in spite of routine exercise. This was possibly due to the fact that the subjects actually exercised at 65% of their maximum heart rate for only 20 minutes three days a week which is not a duration sufficient for weight loss. Another possible factor was that 51 out of 58 subjects (88%) had recently quit smoking which reportedly promotes weight gain (Carney & Goldberg, 1984). Additionally, 69% of the subjects were taking newly prescribed beta-blocker medications, such as Inderal, Lopressor and Tenormin which lowers the pulse rate (Physicians' Desk Reference, 1985) and, therefore, basal metabolism, making weight loss even more difficult to achieve.

Like the percent of ideal body weight, no significant change or trend was found for HDL-cholesterol levels. This was somewhat surprising since the subjects had been routinely exercising for six months and 88% of them had recently quit smoking. There are two possible reasons for this; one of which is again due to the beta-blocker medications which reportedly decreases HDL-cholesterol levels (Leon, Agre, McNally, Bell, Neibling, Grimm, & Hunninghake, 1984).

Another reason may be diet related. Recent studies have reported that polyunsaturated fats lower total cholesterol levels, as

is desired, but HDL-cholesterol levels are lowered as well. Monounsaturated fats, once thought to have no cholesterol lowering effect, are reported to lower total cholesterol levels without lowering the HDL-cholesterol (Mattson & Grundy, 1982; Vega, Groszek, Wolf, & Grundy, 1982). Since the risk for heart disease decreases as the HDL-cholesterol levels increase, monounsaturated fats are becoming the fat of choice. During the time of this study, patients were observed to substitute polyunsaturated fats for saturated fats rather than distribute the fats as recommended; 10% polyunsaturated, 10% monounsaturated, and 10% or less saturated. The fact that the HDL-cholesterol levels did not significantly increase in the subjects after six months may have been due in part to a greater use of polyunsaturated fats than monounsaturated fats in their diets.

# CHAPTER V

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## Summary

The purpose of this retrospective ex post facto study was to explore the existence of a relationship between a competitive personality trait (independent variable) and changes in body weight and serum lipids (dependent variables) in male participants of a cardiac rehabilitation program. Data on body weight, percent of ideal body weight, toal serum cholesterol, HDL-cholesterol, and triglycerides were collected on each subject upon admission and six months into the program. Fifty-eight subjects were divided into either a low (Group I), moderate (Group II), or highly competitive (Group III) group based on their percentile scores on the "H" (hard driving and competitive) scale of the Jenkins' Activity Survey.

Prior to the data analysis all three groups were noted as similar with regard to age, educational level, work status, smoking status, ideal body weight, percent of ideal body weight, serum lipids, and alcoholic beverage intake. No major differences were noted between the groups on any of these variables except for serum triglycerides. The mean triglyceride level was 38 mg/dl higher in Group III than in Group II and 17 mg/dl higher in Group I than Group II.

Standard analysis of covariance techniques were used to analyze the effect of a competitive personality on changes in body weight and

serum lipids within the first six months participation of a cardiac rehabilitation program. The results revealed that no group had a significantly greater change in percent of ideal body weight or serum lipids. Trends, however, were noted in that the adjusted mean change in total cholesterol for the subjects in Groups II and III decreased approximately 4 mg/dl and 9 mg/dl, respectively, while the adjusted mean change in Group I increased by 15 mg/dl. Trends were also noted for serum triglycerides in that Group II had an adjusted mean decrease of 30 mg/dl and Group III of 16 mg/dl; whereas, Group I had a slight adjusted mean increase of 2 mg/dl. No trends were noted for the mean change in percent of ideal body weight or HDL-cholesterol levels.

## Conclusions

The following conclusions were drawn:

1. No statistically significant differences were found among the low, medium, and highly competitive groups and the change in body weight or serum lipids that occurred in the first six months of participation in the cardiac rehabilitation program.
2. Subjects in the cardiac rehabilitation program did not lose weight within the first six months of the program. This was possibly due to recent smoking cessation efforts and/or to taking beta-blocker medications which slow down basal metabolism.

3. Subjects in the cardiac rehabilitation program did not increase their HDL-cholesterol levels within the first six months of the program. This may have been due to the subjects' use of polyunsaturated fats more so than monounsaturated fats in the diet or to the use of beta-blocker medications which reportedly lower HDL-cholesterol levels.

Recommendations

This research tested the effect a competitive personality has on changes made in body weight and serum lipids within the first six months of participation in a cardiac rehabilitation program. Due to the large variability that existed within the dependent variables, a larger sample size is needed to identify changes attributable to personality grouping.

It may be possible that noncompetitive individuals experience denial regarding their heart disease for the first six months and postpone making any lifestyle changes until a later time. The highly competitive individuals may follow a prescribed diet and exercise regimen for the first six months but later regress back to previous eating and exercise habits. Serum lipid levels which may have decreased within the first six months would then return to their previously elevated values. Thus, it is recommended that studies be conducted over a one or two year time span. It would also be beneficial to use other psychological measures as independent variables such as fear, depression, locus of control, and the other scales of the Jenkins' Activity Survey such as speed and impatience and job involvement.

Future studies should be conducted prospectively involving the use of anthropometric measures so as to determine body composition changes. Rather than using a single body weight value post six months as was done in this study, it is advised that weekly weights be taken and averaged at baseline and post six months. Dietary analysis of a three-day food record would add further insight into any weight and serum lipid changes that may or may not occur. It would also be beneficial to have the same laboratory collect and analyze all blood samples for the lipid profile.

For comparison purposes it is advised that similar studies be conducted utilizing healthy individuals involved in a wellness program. Additionally, it is recommended that morbidity and mortality studies be conducted to see if an increased risk for reinfarction occurs in "Type A" individuals making lifestyle changes within a cardiac rehabilitation program as it does in those not involved in a rehabilitation setting.

# BIBLIOGRAPHY

American Diabetes Association, & American Dietetic Association. (1977). A guide for professionals: The effective application of "exchange lists for meal planning." New York: Author.

Burnam, M. A., Pennebaker, J. W., & Glass, D. C. (1975). Time consciousness, achievement striving, and the type A coronary-prone behavior pattern. Journal of Abnormal Psychology, 84, 76-79.

Carney, R. M., & Goldberg, A. P. (1984). Weight gain after cessation of cigarette smoking. New England Journal of Medicine, 310, 614-616.

Carver, C. S., DeGregoris, E., & Gillis, R. (1981). Challenge and type A behavior amongst intercollegiate football players. Journal of Sport Psychology, 3, 140-148.

Helwig, J. T., & Council, K. A. (1979). SAS user's guide. Raleigh, NC: SAS Institute.

Jenkins, C. D. (1978). Behavioral risk factors in coronary artery disease. Annual Review of Medicine, 29, 543-562.

Jenkins, C. D., Zyzanski, S. J., & Roseman, R. H. (1979). Jenkins' activity survey manual (Form C). New York: Psychological Corporation.

Leon, A. S., Agre, J., McNally, C., Bell, C., Neibling, M., Grimm, R., & Hunninghake, D. B. (1984). Blood lipid effects of anti-hypertensive therapy: A double-blind comparison of the effects of methyldopa and propranolol. Journal of Clinical Pharmacology, 24, 209-217.

Matthews, K. A., Glass, D. C., Rosenman, R. H., & Bortner, R. W. (1977). Competitive drive, pattern A, and coronary heart disease: A further analysis of some data from the western collaborative group study. Journal of Chronic Diseases, 30, 489-498.

Mattson, F. H., & Grundy, S. M. (1985). Comparison of effects of dietary saturated, monounsaturated, and polyunsaturated fatty acids on plasma lipids and lipoproteins in man. Journal of Lipid Research, 26, 194-202.

Physicians' desk reference. (1985). Oradell, NJ: E. Barnhart, Medical Economics Laboratory.

Powers, D. E., & Moore, A. O. (1983). Food medication interactions (4th ed.). Tempe, AR: F-MI Publishing.

Rejeski, W. J., Morley, D., & Miller, H. (1983). Cardiac rehabilitation: Coronary-prone behavior as a moderator of graded exercise test performance. Journal of Cardiac Rehabilitation, 3, 339-346.

Rejeski, W. J., Morley, D., & Miller, H. S. (1984). The Jenkins' activity survey: Exploring its relationship with compliance to exercise prescription and MET gain within a cardiac rehabilitation setting. Journal of Cardiac Rehabilitation, 4, 90-94.

Rosenman, R. H., Brand, R. J., Jenkins, D., Friedman, M., Straus, R., & Wurm, M. (1975). Coronary heart disease in the western collaborative group study: Final follow-up. Journal of the American Medical Association, 233, 872-877.

Vega, G. L., Groszek, E., Wolf, R., & Grundy, S. M. (1982). Influence of polyunsaturated fats on composition of plasma lipoproteins and apolipoproteins. Journal of Lipid Research, 23, 811-822.

Zyzanski, S. J., Jenkins, C. D., Ryan, T. J., Flessas, A., & Everist, M. (1976). Psychological correlates of coronary angiographic findings. Archives of Internal Medicine, 136, 1234-1237.

# APPENDIX A

# CONSENT FORM

RESEARCH CONSENT FORM

Department of Food, Nutrition, and Food Service management
University of North Carolina at Greensboro

I have received a full explanation of the study to be conducted at the University of North Carolina at Greensboro entitled "The Relationship of a Hard Driving and Competitive Personality to Changes in Body Weight and Serum Lipids in Male Participants of a Cardiac Rehabilitation Program." The study will be conducted by Mary M. Black, R.D., M.S. under the direction of Dr. Aden Magee, Professor in the Department of Food, Nutrition and Food Service Management.

The major objective of the study is to determine a relationship between test scores for a hard driving and competitive personality trait and changes in body weight and serum lipids in male participants of a cardiac rehabilitation program.

As a participant in this study, I understand that my only involvement is in giving permission to use the medical, social, anthropometric (height, weight and ideal body weight), biochemical, and psychological data already available in the medical and dietary charts at the Greensboro Cardiac Rehabilitation Program. Therefore, I understand that there is no risk of any kind to me personally by my participation in this study. I also understand that the benefits accrued from this study do not affect me personally but will increase the knowledge as to the factors which affect body weight and serum lipid changes in male participants in a cardiac rehabilitation program.

I understand that all information will be considered private and confidential, and that my identity will not be revealed. I also understand that I may withdraw from this study at any time without any penalty or prejudice. Mary Black will be available to answer questions that I may have regarding the study. She may be reached at the Greensboro Cardiac Rehabilitation Office at 272-4146. All of my immediate questions have been answered.

Understanding the above, I agree to participate.

| | |
|---|---|
| Date | Signature, Subject |
| Signature, Witness | Social Security Number, Subject |

# APPENDIX B

## DATA COLLECTION FORM

DATA COLLECTION SHEET

I.D. Number _____ Age _____ Race _____

Diagnosis _____

Smoker: Yes _____ No _____ Quit _____

Education: Attended High School _____ Technical College _____

College _____ Advanced Degree _____

Working _____ Unemployed _____ Disability Benefits _____ Retired _____

Medications Taken (Admission) _____

Drinks Alcoholic Beverages: Yes _____ No _____

Psychological Data:

Hard Driving and Competitive Score _____

Referred for Psychological Counseling _____

Anthropometric Data:

Height _____ IBW _____ lbs.

Admission (baseline weight) _____ lbs. Weight after 6 months _____ lbs.

Highest adult weight _____ lbs. Lowest adult weight _____ lbs.

| Biochemical Data: | Admission (Baseline) | After Six Months |
|---|---|---|
| Total Cholesterol | _____ mg/dl | _____ mg/dl |
| HDL | _____ mg/dl | _____ mg/dl |
| Triglycerides | _____ mg/dl | _____ mg/dl |

Consent form returned and signed: Yes _____ No _____

# APPENDIX C

## RAW DATA

Table C-1

Demographic Data, Smoking and Drinking Status, and Competitive Scores for Subjects with Low Competitive Behavior

| Subject | I.D. No. | Age (yrs.) | Education[a] | Work Status | Competitive Score | Drink[b] | Smoke[c] |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 58 | C | Retired | 30 | Drinker | Quit |
| 2 | 12 | 54 | C | Employed | 1 | Drinker | Quit |
| 3 | 18 | 54 | H.S. | Employed | 10 | Nondrinker | Quit |
| 4 | 19 | 67 | C | Employed | 10 | Drinker | Quit |
| 5 | 20 | 61 | C | Retired | 3 | Drinker | Quit |
| 6 | 21 | 45 | H.S. | Employed | 5 | Drinker | Quit |
| 7 | 24 | 55 | H.S. | Retired | 10 | Drinker | Quit |
| 8 | 30 | 61 | H.S. | Employed | 10 | Drinker | Quit |
| 9 | 32 | 59 | C | Unemployed | 15 | Drinker | Quit |
| 10 | 34 | 42 | H.S. | Employed | 15 | Nondrinker | Quit |
| 11 | 35 | 57 | Adv. Deg. | Employed | 20 | Drinker | Quit |
| 12 | 39 | 61 | H.S. | Employed | 5 | Nondrinker | Quit |
| 13 | 41 | 49 | C | Employed | 10 | Nondrinker | Quit |
| 14 | 43 | 48 | H.S. | Employed | 15 | Nondrinker | Quit |
| 15 | 44 | 49 | H.S. | Employed | 25 | Drinker | Quit |
| 16 | 46 | 57 | H.S. | Employed | 25 | Nondrinker | Quit |
| 17 | 47 | 50 | H.S. | Retired | 10 | Nondrinker | Never |
| 18 | 49 | 57 | H.S. | Employed | 10 | Drinker | Quit |

[a] Education = H.S. - attended high school; C - attended college; Adv. Deg. - advanced degree

[b] Drink = drinks alcoholic beverages in minimal or moderate amounts (no greater than 2 ounces of ethanol per day)

[c] Smoke = Quit - smoked any number of cigarettes prior to the study; Never - never smoked cigarettes, pipe, or cigars

Table C-2

Weight Data at Baseline and Post Six Months for Subjects with Low Competitive Behavior

| Subject | I.D. No. | IBW (lbs.) | Baseline Wgt. (lbs.) | Baseline % IBW | Post Six Months Wgt. (lbs.) | Post Six Months % IBW | Difference in Wt. (lbs) | Difference in % IBW |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 209 | 221 | 106 | 217 | 104 | - 4 | -2 |
| 2 | 12 | 154 | 150 | 97 | 160 | 104 | 10 | 6 |
| 3 | 18 | 193 | 186 | 96 | 188 | 97 | 2 | 1 |
| 4 | 19 | 165 | 155 | 94 | 159 | 96 | 4 | 2 |
| 5 | 20 | 172 | 188 | 109 | 185 | 108 | 3 | - .1 |
| 6 | 21 | 184 | 178 | 98 | 178 | 98 | 0 | 0 |
| 7 | 24 | 166 | 195 | 117 | 196 | 118 | 1 | .6 |
| 8 | 30 | 178 | 186 | 104 | 192 | 108 | 6 | 3 |
| 9 | 32 | 160 | 175 | 109 | 188 | 117 | 13 | 8 |
| 10 | 34 | 189 | 224 | 119 | 208 | 110 | 16 | -8 |
| 11 | 35 | 139 | 130 | 94 | 134 | 96 | 4 | 3 |
| 12 | 39 | 178 | 197 | 111 | 201 | 113 | 4 | 2 |
| 13 | 41 | 147 | 148 | 101 | 156 | 106 | 8 | 5 |
| 14 | 43 | 154 | 172 | 112 | 162 | 105 | -10 | -6 |
| 15 | 44 | 178 | 190 | 110 | 193 | 107 | 3 | -3 |
| 16 | 46 | 166 | 185 | 111 | 187 | 113 | 2 | 1 |
| 17 | 47 | 208 | 222 | 107 | 219 | 105 | 3 | -1 |
| 18 | 49 | 178 | 185 | 104 | 172 | 97 | 13 | -7 |
| Mean | | 173 | 183 | 105 | 183 | 106 | 4.3 | .5 |
| S.D. | | 19.22 | 25.67 | (7.57) | (22.55) | (7.03) | - | 4.51 |
| Range | | 139-209 | 130-224 | (94-119) | (134-219) | (96-118) | (-8-+8) | (-9-+8) |

Note: IBW - ideal body weight

Table C-3

Serum Lipids at Baseline and Post Six Months for Subjects with Low Competitive Behavior

| Subject | I.D. No. | Baseline | | | Post Six Months | | | Difference in Total Chol. (mg/dl) | Difference in HDL-C (mg/dl) | Difference in Triqly. (mg/dl) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Chol. (mg/dl) | HDL-C (mg/dl) | Trigly. (mg/dl) | Total Chol. (mg/dl) | HDL-C (mg/dl) | Trigly. (mg/dl) | | | |
| 1 | 2 | 269 | 38 | 298 | 229 | 44 | 161 | -40 | 6 | -137 |
| 2 | 12 | 184 | 22 | 169 | 235 | 39 | 206 | 51 | 17 | 37 |
| 3 | 18 | 206 | 34 | 169 | 253 | 30 | 283 | 47 | - 4 | 114 |
| 4 | 19 | 208 | 56 | 84 | 207 | 48 | 139 | - 1 | - 8 | 55 |
| 5 | 20 | 249 | 45 | 178 | 263 | 37 | 156 | 14 | - 8 | - 22 |
| 6 | 21 | 178 | 30 | 260 | 184 | 29 | 217 | 6 | - 1 | - 43 |
| 7 | 24 | 246 | 33 | 157 | 255 | 27 | 149 | 9 | - 6 | - 8 |
| 8 | 30 | 190 | 37 | 229 | 198 | 32 | 206 | 8 | - 5 | - 23 |
| 9 | 32 | 237 | 44 | 161 | 255 | 30 | 194 | 18 | -14 | 33 |
| 10 | 34 | 206 | 36 | 185 | 226 | 44 | 120 | 20 | 8 | - 65 |
| 11 | 35 | 229 | 39 | 216 | 283 | 50 | 154 | 54 | 11 | - 62 |
| 12 | 39 | 207 | 24 | 236 | 194 | 27 | 187 | -13 | 3 | - 49 |
| 13 | 41 | 178 | 39 | 126 | 204 | 32 | 159 | 26 | - 7 | 33 |
| 14 | 43 | 224 | 32 | 114 | 230 | 39 | 117 | 6 | 7 | 3 |
| 15 | 44 | 222 | 34 | 131 | 294 | 41 | 192 | 72 | 7 | 61 |
| 16 | 46 | 273 | 47 | 202 | 269 | 31 | 210 | - 4 | -16 | 8 |
| 17 | 47 | 240 | 45 | 89 | 245 | 39 | 81 | 5 | - 6 | - 8 |
| 18 | 49 | 182 | 30 | 168 | 213 | 45 | 26 | 31 | 15 | 98 |
| Mean | | 218 | 37 | 176 | 235 | 37 | 178 | 17 | 0 | 1 |
| S.D. | | (30.03) | (8.40) | (57.32) | (31.60) | (7.39) | (50.86 | 26.78 | 9.66 | 61.91 |
| Range | | (178-273) | (22-56) | (84-298) | (184-294) | (27-50)) | (81-283) | (-40-+72) | (-16-+17) | (-137-+114) |

Note: Total Chol. = total cholesterol; HDL-C = high density lipoprotein cholesterol; Trigly. = triglycerides

Table C-4

Demographic Data, Smoking and Drinking Status, and Competitive Scores for Subjects with Moderate Competitive Behavior

| Subject | I.D. No. | Age (yrs.) | Education[a] | Work Status | Competitive Score | Drink[b] | Smoke[c] |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 50 | H.S. | Unemployed | 60 | Nondrinker | Quit |
| 2 | 3 | 53 | C | Employed | 35 | Drinker | Quit |
| 3 | 4 | 49 | H.S. | Unemployed | 40 | Drinker | Quit |
| 4 | 7 | 49 | C | Unemployed | 65 | Drinker | Quit |
| 5 | 8 | 63 | Adv. Deg. | Employed | 45 | Drinker | Never |
| 6 | 10 | 60 | H.S. | Unemployed | 40 | Nondrinker | Never |
| 7 | 11 | 57 | H.S. | Unemployed | 50 | Nondrinker | Never |
| 8 | 13 | 46 | C | Employed | 65 | Drinker | Quit |
| 9 | 14 | 68 | H.S. | Retired | 65 | Drinker | Quit |
| 10 | 15 | 66 | H.S. | Retired | 60 | Nondrinker | Never |
| 11 | 17 | 68 | H.S. | Employed | 60 | Drinker | Quit |
| 12 | 28 | 62 | C | Employed | 40 | Nondrinker | Never |
| 13 | 29 | 38 | C | Employed | 45 | Drinker | Never |
| 14 | 33 | 52 | C | Employed | 50 | Drinker | Quit |
| 15 | 37 | 64 | H.S. | Employed | 65 | Nondrinker | Quit |
| 16 | 42 | 43 | Adv. Deg. | Employed | 55 | Drinker | Quit |
| 17 | 48 | 53 | H.S. | Unemployed | 60 | Drinker | Quit |
| 18 | 50 | 41 | C | Employed | 65 | Nondrinker | Quit |
| 19 | 54 | 59 | C | Employed | 60 | Nondrinker | Quit |
| 20 | 55 | 39 | C | Employed | 50 | Drinker | Quit |
| 21 | 57 | 42 | H.S. | Employed | 55 | Drinker | Quit |
| 22 | 58 | 45 | Adv. Deg. | Employed | 55 | Drinker | Quit |

[a] Education = H.S. - attended high school; C - attended college; Adv. Deg. - advanced degree

[b] Drink = drinks alcoholic beverages in minimal or moderate amounts (no greater than 2 ounces of ethanol per day)

[c] Smoke = Quit - smoked any number of cigarettes prior to the study; Never - never smoked cigarettes, pipe, or cigars

Table C-5

Weight Data at Baseline and Post Six Months for Subjects with Moderate Competitive Behavior

| Subject | I.D. No. | IBW (lbs.) | Baseline Wgt. (lbs.) | Baseline % IBW | Post Six Months Wgt. (lbs.) | Post Six Months % IBW | Difference in Wt. (lbs) | Difference in % IBW |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 178 | 195 | 110 | 180 | 101 | -15 | - 9 |
| 2 | 3 | 166 | 175 | 1051 | 185 | 111 | 10 | 6 |
| 3 | 4 | 150 | 156 | 104 | 165 | 110 | 0 | 6 |
| 4 | 7 | 172 | 178 | 104 | 180 | 105 | 2 | 1 |
| 5 | 8 | 184 | 179 | 97 | 179 | 97 | 0 | 0 |
| 6 | 10 | 156 | 180 | 115 | 173 | 111 | - 7 | - 4 |
| 7 | 11 | 169 | 165 | 98 | 169 | 100 | 4 | 2 |
| 8 | 13 | 165 | 170 | 103 | 166 | 101 | - 4 | - 2 |
| 9 | 14 | 175 | 169 | 104 | 173 | 102 | 4 | - 2 |
| 10 | 15 | 166 | 135 | 81 | 141 | 85 | 6 | 4 |
| 11 | 17 | 178 | 177 | 99 | 176 | 99 | - 1 | 0 |
| 12 | 28 | 142 | 155 | 109 | 148 | 104 | - 7 | - 5 |
| 13 | 29 | 158 | 157 | 99 | 156 | 99 | - 1 | 0 |
| 14 | 33 | 187 | 180 | 96 | 185 | 99 | 5 | - 3 |
| 15 | 37 | 152 | 169 | 111 | 167 | 110 | - 2 | - 1 |
| 16 | 42 | 178 | 178 | 100 | 178 | 100 | 0 | 0 |
| 17 | 48 | 160 | 164 | 103 | 169 | 106 | 5 | 3 |
| 18 | 50 | 202 | 229 | 113 | 228 | 113 | - 1 | 0 |
| 19 | 54 | 166 | 186 | 112 | 184 | 111 | - 2 | - 1 |
| 20 | 55 | 176 | 192 | 109 | 198 | 113 | 6 | 4 |
| 21 | 57 | 172 | 248 | 144 | 221 | 129 | -27 | -15 |
| 22 | 58 | 189 | 205 | 109 | 213 | 113 | 8 | 4 |
| Mean | | 170 | 180 | 106 | 179 | 105 | - .36 | - 1 |
| S.D. | | 14.02 | 24.50 | 11.36 | 21.28 | 8.60 | - | 4.92 |
| Range | | (142-202) | (135-248) | (81-144) | (141-228 | (85-119) | (-27-+10) | (-16-+6) |

Note: IBW - ideal body weight

Table C-6

Serum Lipids at Baseline and Post Six Months for Subjects with Moderate Competitive Behavior

| Subject | I.D. No. | Baseline | | | Post Six Months | | | Difference in Total Chol. (mg/dl) | Difference in HDL-C (mg/dl) | Difference in Trigly. (mg/dl) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Chol. (mg/dl) | HDL-C (mg/dl) | Trigly. (mg/dl) | Total Chol. (mg/dl) | HDL-C (mg/dl) | Trigly. (mg/dl) | | | |
| 1 | 1 | 276 | 40 | 240 | 236 | 38 | 96 | - 40 | - 2 | -144 |
| 2 | 3 | 219 | 50 | 132 | 276 | 45 | 162 | 57 | - 5 | 30 |
| 3 | 4 | 297 | 0 | 149 | 302 | - | 187 | 5 | - | 38 |
| 4 | 7 | 163 | 39 | 103 | 182 | 38 | 155 | 19 | - 1 | 52 |
| 5 | 8 | 159 | - | 185 | 196 | 41 | 174 | 37 | - | - 11 |
| 6 | 10 | 325 | 44 | 160 | 172 | 29 | 87 | -153 | -15 | - 73 |
| 7 | 11 | 232 | 24 | 149 | 217 | 30 | 94 | - 15 | 6 | - 55 |
| 8 | 13 | 240 | 30 | 206 | 218 | 30 | 166 | - 22 | 0 | - 40 |
| 9 | 14 | 208 | 28 | 300 | 185 | 23 | 230 | - 23 | - 5 | - 70 |
| 10 | 15 | 173 | 31 | 110 | 183 | 48 | 89 | 10 | 17 | - 21 |
| 11 | 17 | 222 | 26 | 104 | 188 | 23 | 82 | - 34 | - 3 | - 22 |
| 12 | 28 | 258 | 38 | 197 | 243 | 34 | 130 | - 15 | - 4 | - 67 |
| 13 | 29 | 251 | 31 | 103 | 273 | 36 | 110 | 22 | 5 | 7 |
| 14 | 33 | 217 | 39 | 99 | 203 | 44 | 92 | - 14 | 5 | - 7 |
| 15 | 37 | 229 | 46 | 164 | 189 | 34 | 104 | - 40 | -12 | - 60 |
| 16 | 42 | 203 | 47 | 136 | 174 | 44 | 122 | - 29 | - 3 | - 14 |
| 17 | 48 | 190 | 31 | 128 | 199 | 31 | 123 | 9 | 0 | - 5 |
| 18 | 50 | 280 | 24 | - | 279 | 31 | - | - 1 | 7 | - |
| 19 | 54 | 224 | 33 | 172 | 229 | 29 | 189 | 5 | - 4 | 17 |
| 20 | 55 | 247 | 28 | 190 | 391 | 43 | 163 | 144 | 15 | - 27 |
| 21 | 57 | 229 | 38 | 183 | 186 | 33 | 155 | - 43 | - 5 | - 28 |
| 22 | 58 | 205 | 32 | 120 | 196 | 40 | 188 | - 4 | 8 | 68 |
| Mean | | 229 | 35 | 159 | 223 | 35 | 138 | - 6 | 0 | - 21 |
| S.D. | | (41.76) | (7.79) | (50.90) | (53.22) | (7.14) | (42.58) | (52.49 | (7.98) | (48.80) |
| Range | | (159-325) | (24-50) | (99-300) | (172-391) | (23-48) | (82-230) | (-153-+144) | (-15-+17) | (-144=+68) |

Note: Total Chol. = total cholesterol; HDL-C = high density lipoprotein cholesterol; Trigly. = triglycerides

Table C-7

Demographic Data, Smoking and Drinking Status, and Competitive Scores for Subjects with Highly Competitive Behavior

| Subject | I.D. No. | Age (yrs.) | Education[a] | Work Status | Competitive Score | Drink[b] | Smoke[c] |
|---|---|---|---|---|---|---|---|
| 1 | 5 | 63 | H.S. | Retired | 80 | Drinker | Quit |
| 2 | 6 | 67 | C | Employed | 70 | Drinker | Quit |
| 3 | 9 | 65 | H.S. | Employed | 95 | Drinker | Quit |
| 4 | 16 | 53 | Assoc. Deg. | Employed | 90 | Nondrinker | Quit |
| 5 | 22 | 45 | Adv. Deg. | Employed | 85 | Drinker | Quit |
| 6 | 23 | 40 | C | Employed | 90 | Nondrinker | Quit |
| 7 | 25 | 58 | C | Unemployed | 80 | Drinker | Quit |
| 8 | 26 | 63 | H.S. | Retired | 85 | Drinker | Quit |
| 9 | 27 | 70 | C | Employed | 90 | Nondrinker | Quit |
| 10 | 31 | 61 | H.S. | Retired | 80 | Drinker | Quit |
| 11 | 36 | 64 | H.S. | Retired | 70 | Drinker | Quit |
| 12 | 38 | 63 | H.S. | Retired | 75 | Drinker | Quit |
| 13 | 40 | 48 | C | Employed | 80 | Drinker | Quit |
| 14 | 45 | 50 | Adv. Deg. | Retired | 80 | Drinker | Quit |
| 15 | 51 | 41 | C | Employed | 90 | Drinker | Quit |
| 16 | 52 | 65 | H.S. | Unemployed | 95 | Nondrinker | Quit |
| 17 | 53 | 63 | Adv. Deg. | Employed | 80 | Drinker | Quit |
| 18 | 56 | 47 | C | Unemployed | 75 | Nondrinker | Quit |

[a] Education = H.S. - attended high school; Assoc. Deg. - attended technical college; C - college; adv. Deg. - advanced degree

[b] Drink = drinks alcoholic beverages in minimal or moderate amounts (no greater than 2 ounces of ethanol per day

[c] Smoke = Quit - smoked any number of cigarettes prior to the study; Never - never smoked cigarettes, pipe, or cigars

Table C-8

Weight Data at Baseline and Post Six Months for Subjects with Highly Competitive Behavior

| Subject | I.D. No. | IBW (lbs.) | Baseline Wgt. (lbs.) | Baseline % IBW | Post Six Months Wgt. (lbs.) | Post Six Months % IBW | Difference in Wt. (lbs) | Difference in % IBW |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 158 | 170 | 108 | 168 | 106 | - 2 | -2 |
| 2 | 6 | 166 | 179 | 108 | 181 | 109 | 2 | 1 |
| 3 | 9 | 185 | 183 | 99 | 188 | 102 | 5 | 3 |
| 4 | 16 | 150 | 148 | 99 | 146 | 97 | - 2 | -2 |
| 5 | 22 | 166 | 175 | 105 | 165 | 99 | -10 | -6 |
| 6 | 23 | 162 | 170 | 105 | 168 | 104 | - 2 | -1 |
| 7 | 25 | 142 | 140 | 99 | 140 | 99 | 0 | 0 |
| 8 | 26 | 184 | 183 | 100 | 175 | 95 | - 8 | -5 |
| 9 | 27 | 142 | 152 | 107 | 154 | 109 | 2 | 2 |
| 10 | 31 | 166 | 165 | 99 | 161 | 97 | - 4 | -2 |
| 11 | 36 | 172 | 180 | 105 | 183 | 106 | 3 | 1 |
| 12 | 38 | 151 | 166 | 110 | 168 | 111 | 2 | 1 |
| 13 | 40 | 172 | 180 | 105 | 191 | 111 | 11 | 6 |
| 14 | 45 | 196 | 215 | 110 | 210 | 107 | - 5 | -3 |
| 15 | 51 | 166 | 191 | 115 | 194 | 117 | 3 | 2 |
| 16 | 52 | 202 | 237 | 117 | 238 | 118 | 1 | 1 |
| 17 | 53 | 192 | 180 | 94 | 183 | 95 | 3 | 1 |
| 18 | 56 | 172 | 191 | 111 | 182 | 106 | 9 | -5 |
| Mean | | 169 | 178 | 105 | 178 | 105 | (.44) | 0 |
| S.D. | | (17.50) | (22.65) | (6.24) | (23.04) | (6.94) | - | (3.07) |
| Range | | (142-202) | (140-237) | (94-117) | (140-238) | (95-118) | (-10-+11) | (-6-+6) |

Note: IBW - ideal body weight

Table C-9

Serum Lipids at Baseline and Post Six Months for Subjects with Highly Competitive Behavior

| Subject | I.D. No. | Baseline | | | Post Six Months | | | Difference in Total Chol. (mg/dl) | Difference in HDL-C (mg/dl) | Difference in Trigly. (mg/dl) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Chol. (mg/dl) | HDL-C mg/dl) | Trigly. (mg/dl) | Total Chol. (mg/dl) | HDL-C (mg/dl) | Trigly. (mg/dl) | | | |
| 1 | 5 | 291 | 31 | 255 | 302 | 35 | 198 | 11 | 4 | - 57 |
| 2 | 6 | 189 | 37 | 200 | 188 | 30 | 226 | - 1 | - 7 | 26 |
| 3 | 9 | 302 | 32 | 270 | 290 | 32 | 259 | -12 | 0 | - 11 |
| 4 | 16 | 103 | 29 | 95 | 129 | 24 | 149 | 26 | - 5 | 54 |
| 5 | 22 | 191 | 41 | 214 | 198 | 54 | 94 | 7 | 13 | -120 |
| 6 | 23 | 308 | 28 | - | 286 | 30 | 295 | -22 | 2 | - |
| 7 | 25 | 235 | 35 | 247 | 199 | 34 | 187 | -36 | - 1 | - 60 |
| 8 | 26 | 277 | 34 | 172 | 231 | 37 | 131 | -46 | 3 | - 41 |
| 9 | 27 | 223 | 37 | 143 | 215 | 41 | 151 | - 8 | 4 | 8 |
| 10 | 31 | 198 | 21 | 244 | 165 | 24 | 280 | -33 | 3 | 36 |
| 11 | 36 | 193 | 30 | 304 | 206 | 31 | 173 | 13 | 1 | -131 |
| 12 | 38 | 284 | 43 | 272 | 285 | 36 | 329 | 1 | - 7 | 57 |
| 13 | 40 | 229 | 25 | 229 | 239 | 26 | 151 | 10 | 1 | - 78 |
| 14 | 45 | 252 | 55 | 197 | 192 | 35 | 98 | -60 | -20 | - 99 |
| 15 | 51 | 181 | 26 | 121 | 205 | 45 | 89 | 24 | 19 | - 32 |
| 16 | 52 | 217 | - | 164 | 227 | 37 | 149 | 10 | - | - 15 |
| 17 | 53 | 182 | 27 | 94 | 159 | 32 | 86 | -23 | 5 | - 8 |
| 18 | 56 | 190 | 26 | 134 | 171 | 26 | 149 | -19 | 0 | 15 |
| Mean | | 225 | 33 | 197 | 216 | 34 | 177 | - 9 | 1 | - 27 |
| S.D. | | (53.34) | (8.22) | (64.80) | (49.14) | (7.60) | (74.00) | (24.36) | (8.40) | (58.00) |
| Range | | (103-308) | (21-55) | (94-304) | (129-302) | (24-54) | (86-329) | (-60-+26) | (-20-+19) | (-131-+57) |

Note: Total Chol. = total cholesterol; HDL-C = high density lipoprotein cholesterol; Trigly. = triglycerides

# APPENDIX D

# SUPPLEMENTARY ANALYSIS TABLES

Table D-1

Pearson Correlation Coefficients Between the Variables at Baseline

| | Total Cholesterol | HDL-Cholesterol | Triglycerdies | Percent of Ideal Body Weight |
|---|---|---|---|---|
| Total Cholesterol | 1.00 | .21 | .31 | .28 |
| HDL-Cholesterol | | 1.00 | -0.12 | 0.14 |
| Triglycerides | | | 1.00 | 0.12 |
| Percent of Ideal Body Weight | | | | 1.00 |

Table D-2

Pearson Correlation Coefficients on the Difference in the Serum Lipids and Percent Ideal Body Weight After Six Months

| | Difference Total Cholesterol | Difference HDL-Cholesterol | Difference Triglycerides | Difference Percent of Ideal Body Weight |
|---|---|---|---|---|
| Difference Total Cholesterol | 1.00 | 0.45 | 0.38 | 0.41 |
| Difference HDL-Cholesterol | | 1.00 | -0.00 | 0.04 |
| Difference Triglycerides | | | 1.00 | 0.30 |
| Difference Percent of Ideal Body Weight | | | | 1.00 |

Table D-3

Covariance Analysis of Total Cholesterol Data with Competitive Group

| Source | df | Sum of Squares | Mean Squares | F Value |
|---|---|---|---|---|
| Covariate | 1 | 11410.82 | | NS |
| HDC Group | 2 | 5855.44 | 2927.72 | |
| Error | 54 | 70254.08 | 1301.00 | |
| Total | 57 | 87520.34 | | |

n = 58

Table D-4

Covariance Analysis of High Density Lipoprotein Cholesterol with Competitive Group

| Source | df | Sum of Squares | Mean Squares | F Value |
|---|---|---|---|---|
| Covariate | 1 | 1440.48 | | NS |
| HDC Group | 2 | 27.14 | 13.57 | |
| Error | 51 | 2458.49 | 48.21 | |
| Total | 54 | 3926.11 | | |

n = 55

Table D-5

Covariance Analysis of Serum Triglycerides with Competitive Group

| Source | df | Sum of Squares | Mean Squares | F Value |
|---|---|---|---|---|
| Covariate | 1 | 46598.95 | | NS |
| HDC Group | 2 | 9300.67 | 4650.34 | |
| Error | 52 | 118349.94 | 2275.96 | |
| Total | 55 | 174249.55 | | |

n = 56

Table D-6

Covariance Analysis of Percent Ideal Body Weight and Competitive Group

| Source | df | Sum of Squares | Mean Squares | F Value |
|---|---|---|---|---|
| Covariate | 1 | 266.99 | | NS |
| HDC Group | 2 | 7.17 | 3.59 | |
| Error | 54 | 749.42 | 13.88 | |
| Total | 57 | 1023.59 | | |

n = 58