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EFFECTS OF PHYSICAL EXERCISE AND STRESS MANAGEMENT
TRAINING ON TYPE A INDIVIDUALS PARTICIPATING IN A PHYSICAL
FITNESS PROGRAM

The University of Oklahoma

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EFFECTS OF PHYSICAL EXERCISE AND STRESS MANAGEMENT TRAINING
ON TYPE A INDIVIDUALS PARTICIPATING
IN A PHYSICAL FITNESS PROGRAM

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TUCK TAKASHI SAUL

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EFFECTS OF PHYSICAL EXERCISE AND STRESS MANAGEMENT TRAINING
ON THE TYPE A INDIVIDUALS PARTICIPATING
IN A PHYSICAL FITNESS PROGRAM

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TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	v
ABSTRACT	1
INTRODUCTION	2
METHOD	5
RESULTS.	8
DISCUSSION	9
REFERENCES	15
APPENDIX A. PROSPECTUS.	20
APPENDIX B. CONSENT FORM.	75
APPENDIX C. JENKINS ACTIVITY SURVEY	77
APPENDIX D. THE TRAIT SCALE / STATE-TRAIT ANXIETY INVENTORY	84
APPENDIX E. PRE- & POST-ASSESSMENT QUESTIONNAIRES.	87
APPENDIX F. STRESS MANAGEMENT TRAINING.	90
APPENDIX G. INTRODUCTORY INFORMATION SHEET.	94
APPENDIX H. SUBJECT CHARACTERISTICS OF TOTAL SAMPLE.	96

LIST OF TABLES

	<u>Page</u>
TABLE 1. SEPARATE ANALYSES OF COVARIANCE OF THE DEPENDENT MEASURES USING PRE-SCORES AS COVARIATES (PRE- AND POST-MEANS). . . .	17
TABLE 2. INDIVIDUAL COMPARISONS OF SIGNIFICANT DEPENDENT MEASURES	18

ABSTRACT

This study examined the effects of physical exercise and stress management with exercise on non-coronary involved Type A individuals participating in a physical fitness program. It was hypothesized that physical exercise and/or stress management plus exercise would significantly change the Type A behavior pattern. Forty-five male Police Officers from a large mideastern metropolitan city, between the ages of 25 and 65 who were identified as being Type A, served as subjects in this study. The Jenkins Activity Survey (Form C), the Trait Scale of the State-Trait Anxiety Inventory, and physiological measures of blood pressure and resting heart rate were used as the dependent measures. This study failed to demonstrate any significant changes in the Type A behavior pattern occurring as a result of participating in a physical exercise program or from the stress management training with exercise. The reduction in the measures of blood pressure, resting heart rate, and trait anxiety supported the positive effects of physical exercise and stress management that have been reported in other studies.

EFFECTS OF PHYSICAL EXERCISE AND STRESS MANAGEMENT TRAINING
ON TYPE A INDIVIDUALS PARTICIPATING
IN A PHYSICAL FITNESS PROGRAM

The trend in mortality from coronary heart disease points to the continuation of this disease as the leading cause of morbidity and mortality in this country (Borhani, 1977). Further, Borhani has reported that the mortality rate from coronary heart disease recently has been increasing more rapidly among the younger age group (25 to 54) than those in their sixth or seventh decade of life. He also states that every year nearly one million men and women in the United States are subject to a myocardial infarction, either fatal or nonfatal.

Medical research has shown the Type A behavior pattern to be a reliable and valid indicator of a future disposition to the pathogenesis of coronary heart disease (Jenkins, Rosenman, & Zyzanski, 1974). In a series of retrospective and prospective studies, the Type A behavior pattern has been associated with about twice the prevalence of coronary heart disease as is associated with the Type B or non-coronary behavior pattern (e.g., Jenkins, Rosenman, & Zyzanski, 1974; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975).

Glass and his associates (1977) have investigated

the psychological characteristics of the Type A behavior pattern under controlled laboratory conditions in an attempt to isolate its specific components. Their experimental studies have systematically determined three overt aspects of Type A: (a) the competitive achievement strivings and the suppression of fatigue, (b) the exaggerated sense of time urgency and (c) the aggressiveness and hostility component.

In related literature, exercise conditioning programs have been widely recommended in both the medical literature and the lay press as a means of decreasing the incidence, prevalence, severity or mortality of coronary heart disease (Bonanno, 1977). Proponents of physical training have grown in numbers and enthusiasm with the appearance of many reports which substantiate an improvement in cardiovascular functional capacity following exercise programs, both in normal persons and in patients with a history of coronary heart disease (Clausen, 1976; Hellerstein, 1968; Rechnitzer, Yuhasz, & Paivio, 1967; Siegel, Blomqvist, & Mitchell, 1970). However, as noted by Bonanno (1977), a cause and effect relationship between physical inactivity and coronary heart disease has not been firmly demonstrated. Furthermore, there is not as yet conclusive proof that chronic physical exercise will in fact prevent this disease or reduce its mortality and morbidity (Fox, Naughton, & Gorman, 1972).

Recently, Friedman (1979) has stated that chronic physical exercise which in any way could be construed by an indivi-

dual as having competitive aspects is in fact dangerous for those individuals characterized as having Type A qualities. The danger lies in the tendency for Type A individuals to utilize physical exercise such as jogging or swimming in the same manner as they do other task functions, making the activity into a competitive, stressful venture, rather than an activity for leisure and relaxation purposes. This statement by Friedman is in direct opposition to many proponents of systematic physical exercise who point to the extensive body of evidence supporting the contention that participation in a regular exercise program results for most individuals in improving physiological functioning and diminishing health problems related to the effects of stress, including cardiovascular dysfunctions (Wilmore, 1977). However, little research has specifically examined the effect of physical exercise on the Type A behavior pattern.

Friedman (1979) has also stated that Type A behavior cannot be modified successfully unless these persons already have suffered some type of heart dysfunction. However, several researchers have recently published articles which tend to refute Friedman's point. Suinn (1977), Suinn and Bloom (1978), and Roskies, Speval, and Surkis (in press) have demonstrated that the use of anxiety management training within a stress management format can be effective in reducing aspects of the Type A behavior pattern. It is important to point out that the treatment approaches utilized by these investigators did not

include any form of physical exercise, which has also been shown to be effective in managing the consequences of stress.

Therefore, this study was designed to explore the effects of a relatively short (7 week) regime of physical exercise (E) and stress management training plus exercise (E+SM) on non-coronary involved Type A individuals participating in a physical fitness program. It was hypothesized that persons in the E+SM condition would show greater reduction in Jenkins Activity Survey scores (Type A), trait anxiety scores, and physiological measures than persons in the E condition. Persons in both experimental groups were expected to show greater reduction in the dependent measures than the members of the control group.

METHOD

Subjects

Sixty-four male Police Officers from a large mid-eastern metropolitan city who were participating in an on-going physical fitness program (P.U.L.S.E./ YMCA) were used as the experimental subject pool for this study. From this group, there were 33 Officers who had Type A scale scores, of whom 30 were randomly assigned to the two treatment conditions, either the exercise-only (E) group or the stress management plus exercise (E+SM) group. In addition, out of 33 Police Officers who were not involved in any regular physical fitness program, 15 Officers who were found to have Type A scale scores were

selected for the control group.

Participants were between the ages of 25 and 65, without any history of previous coronary heart disease, and had not participated in a stress management program within the last 6 months.

Instruments

The Jenkins Activity Survey - Form C (JAS) is a self-reporting, multiple choice questionnaire of 52 items developed by Jenkins, Zyzanski, and Rosenman (1979) to measure the Type A behavior pattern. The JAS provides 4 standard scores ($\bar{x}=0$, s.d.=10): three factorially independent components of the Type A construct - 1. Speed and Impatience, 2. Job Involvement, and 3. Hard-driving and Competitive; and 4. the Type A scale, which assesses the multifactorial clinical construct of the coronary-prone behavior pattern. Jenkins et al. (1979) report the 3 factor scores of the JAS make relatively independent contributions to the overall assessment of the Type A scale score.

The Trait Scale of the State-Trait Anxiety Inventory (STAI) developed by Spielberger, Gorsuch, and Lushene (1970) was also used in this study. The STAI consists of two 20-item self-report scales designed to measure anxiety-proneness (trait) as well as the current level of tension and apprehension (state). Research (Bahrke & Morgan, 1978; Sime, 1977) has shown that chronic exercise significantly reduces the level of anxiety associated with non-phobic stress.

Further, demographic data and other self-report information was gathered through the use of pre- and post-questionnaires. Such information as present work situation, educational level, marital status, age, and perceived levels of stress and fitness was obtained.

In addition, as has been commonly utilized in previous studies, blood pressure and resting heart rate readings were used to make inferences to changes in physical fitness and tension levels.

Procedures

Instructions, consisting of an explanation of what would be required from each participant, were given to all volunteers. Each person was given an informed consent form, a pre-assessment questionnaire, the Jenkins Activity Survey, and the Trait Scale of the State-Trait Anxiety Inventory to complete. Blood pressures and resting heart rates were also taken at this time.

Those Officers in the exercise-only (E) group received the regularly planned aerobic exercise regime being offered by the instructing facility. This involved jogging and various stretching exercises within a group format. As with the subjects in the control group, the subjects in the E condition were contacted twice, during the pretesting and at posttest times.

Subjects in the E+SM condition received the four stress management training sessions in addition to the exer-

cise program. The stress management training seminars provided educational information regarding the mechanism and effects of stress, the influence of nutrition and exercise, and emphasized the identification of each participant's personal reaction to stress. In addition, stress management techniques such as relaxation training, use of imagery, and other cognitive behavior modification methods were introduced. However, no direct reference to the Type A behavior pattern were made in the sessions in order to minimize test sensitization effects.

Following the conclusion of the seventh week of the study, all subjects in the study were contacted to retake the JAS and the Trait Scale of the STAI. In addition, they also completed a brief post-assessment questionnaire and blood pressure and resting heart rates were also taken.

RESULTS

The data were analyzed by separate analyses of covariance, with posttest scores covaried against their matching pretest scores. The .05 level of significance was used for all analyses performed in this study. Dunn's individual comparison method was used to test for significant differences between group means when a significant ANCOVA was found.

Of the analyses of covariance, no significant differences were found for the Type A scale score or any of its component scores, thus failing to support the hypothesized change in Type A behavior due to physical exercise and stress management training. However, significant differences were

found for trait anxiety and the physiological measures of blood pressure and resting heart rate between subjects who participated in physical exercise or physical exercise and stress management training and subjects in the control group. In addition, significant differences were found between the 2 experimental groups and the control group on the changes in their perceived levels of fitness and stress. The pre- and posttest means and the ANCOVA results of these separate analyses, along with the post-hoc comparison results, are summarized in Tables 1 and 2.

Insert Table 1 & 2

DISCUSSION

The main question raised in this study was whether a relatively short regime (7 weeks) of physical exercise would have an effect on Type A individual's level of trait anxiety, Type A scale scores, and certain physiological measures. The men who participated in the fitness program reported significantly greater reduction of trait anxiety scores as well as lower blood pressures and resting heart rates than those persons in the control group. These outcomes are congruent with previous research which has shown significant physiological and psychological benefits (anxiety reduction) derived from physical exercise (Stoedefalke, 1977). In his review of the literature, Stoedefalke reported that since 1964, some 19 studies have been pub-

lished on the effect of physical training on anxiety reduction and on physiological indices. These studies ranged from 5 weeks to 2 years in duration, had all male subjects who ranged in age from 20 to 60 years old, and who exercised 2 to 6 days a week. All of these studies reported changes in the desired direction between the initial and final testing sessions. The results of this study indicate that the 7 week exercise condition of this study achieved results comparable to those of previous studies.

No significant changes were found on the measures used to assess the Type A behavior pattern in this study. Several factors may account for this lack of significant change. In the presentation of the stress management training in this study, no mention was made of the Type A variables nor their association with stress and coronary heart disease risk, fearing a test sensitization effect which might bias the results. However, evidently no such precautions were taken in the two studies reporting significant reductions in the Type A measures with the use of anxiety management training (Roskies, Spevack, & Surkis, in press; Suinn & Bloom, 1978). This raises concerns for further research regarding measurement of the Type A behavior syndrome as to how to insure that true behavioral and attitudinal changes are taking place and not just test/experimental sensitization.

The stress management training format used in this study focused upon presenting to the participants a diverse,

holistic approach to the management of stress-related symptoms. This is in contrast to previous studies (Suinn, 1977; Suinn & Bloom, 1978) reporting reduction in the Type A behavior pattern which utilized a singular (anxiety management training) treatment approach. Suinn and Bloom (1978) reported significant reductions in the measures of trait anxiety and Factor H (Hard-driving and Competitive) in only 6 training sessions utilizing a model which involved relaxation training, use of imagery to precipitate stress reactions, identification of muscular signs of stress onset, and training in stress reduction through relaxation. Since a similar training model was also incorporated in this study's stress management training seminars, the results of this study suggest that offering a more comprehensive stress management training may be less effective, or even interfere with producing changes in the measures of Type A. Future research may need to be done to clarify this issue.

The results on the JAS Factor H show an interesting direction in that the exercise (E) group showed a trend towards becoming more Hard-driving and Competitive and more Type A. In contrast, the stress management plus exercise (E+SM) group showed a movement towards more Type B on the Factor H. However, it should be noted that the posttest increase in Factor H in the exercise (E) group was primarily due to large changes in only 2 individuals and not a general trend in the group. Thus, these results fail to lend support to Friedman's conten-

tion previously mentioned that exercise programs for Type A persons are counterproductive since they turn it into another area to compete and work hard. More research will need to be done to ascertain the merits of Friedman's position.

Matthew and Brunson (1979) have noted that the failure of Type A individuals to be attentive to their own physiological functioning, especially when involved in an activity, contributes to the overall risk to health related problems including coronary heart disease. They state that the Type A's failure to acknowledge and report fatigue as well as other physical symptoms of impending illness during task performance, such as physical exercise, does not allow them to use their symptoms elicited by stress as cues to alter their behavior/activity to less stressful forms. In light of the results of this study, it may be important for facilities offering physical fitness programs to recommend not only a complete physical examination be taken for persons beginning an exercise program, but also an assessment of the Type A behavior pattern. Then programs with instructors knowledgeable about the characteristics and risks associated with the Type A behavior pattern would be able to more effectively monitor and intervene, thereby fostering a more preventative environment in which physical exercise is used appropriately by Type A individuals.

Since entry into police work requires a demonstration of physical fitness and continuing fitness is stressed, the

officers who participated in this study are not a representative group. The data from the pre- and post-assessment questionnaires shows that on the whole, Police Officers viewed themselves as adequately fit, irrespective of whether they exercised regularly or not; not extremely stressed, although in an occupation with high stress factors; lacking in anxiety-proneness; and generally presented a picture of individuals who are physiologically and psychologically healthy. It is highly plausible that Police Officers' tendency to appear without deficits in psychological studies may have some implications to the results of this study, particularly to this study's generalizability to other populations.

The results of this study pose some questions for future research in this area. The limited duration of the study certainly may have been a significant factor in the overall results. A longer period of exercise between pre- and posttesting might provide a clearer indication of the effects of physical exercise on Type A individuals. Certainly, an experimental group in stress management training only and a more extensive stress management training period would clarify the effects regarding Type A measures. The addition of Type B individuals into the treatment conditions would further clarify the particular effects of physical exercise and stress management training on this behavioral construct. Finally, this particular fitness program involved jogging and various stretching exercises done within a group format. Recreational

types of exercise, such as racquetball, tennis, golf, etc., may have differing effects on the Type A individual which warrant future investigation.

In summary, the results of this study failed to demonstrate in Type A individuals any changes in the Type A behavior pattern occurring from the effect of participation in a physical fitness program. Contrary to previous findings (Roskies, Spevack, & Surkis, in press; Suinn & Bloom, 1978), reduction in stress levels measured by trait anxiety factor and by the physiological measures of blood pressure and resting heart rate, did not influence any changes taking place on the measures of Type A. The outcomes of the measures of blood pressure, resting heart rate, and trait anxiety support the positive effects of physical exercise that have been reported in other studies.

REFERENCES

- Bahrke, M.S., & Morgan, W.P. Anxiety reduction following exercise and meditation. Cognitive Therapy & Research, 1978, 2 (4), 323-333.
- Bonanno, J.A. Coronary risk factor modification by chronic physical exercise. In E.A. Amsterdam, J.H. Wilmore, & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Borhani, N.O. Epidemiology of coronary heart disease. In E.A. Amsterdam, J.H. Wilmore, & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Clausen, J.P. Circulatory adjustments to dynamic exercise and effect of physical training in normal subjects and with patients with coronary heart disease. Progress in Cardiovascular Disease, 1976, 18, 459-495.
- Fox, S.M., Naughton, J.P., & Gorman, P.A. Physical activity and cardiovascular health. Modern Concerns in Cardiovascular Disease, 1972, 41 (4), 17-20.
- Friedman, M. The modification of Type A behavior in post-infarction patients. American Heart Journal, 1979, 97, 551-560.
- Friedman, M. Interview with Dr. Meyer Friedman. U.S. News & World Report, October, 1979, 55-57.
- Glass, D.C. Behavior patterns, stress & coronary disease. Hillsdale, New York: Lawrence Erlbaum Associates, 1977.
- Hellerstein, H.K. Exercise therapy in coronary disease. Bulletin of the New York Academy of Medicine, 1968, 44, 1028-1047.
- Jenkins, C.D., Rosenman, R.H., & Zyzanski, S.J. Prediction of clinical coronary heart disease by a test for the coronary-prone behavior pattern. New England Journal of Medicine, 1974, 290, 1271-1275.
- Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. Manual for the Jenkins Activity Survey - Form C. New York: The Psychological Corporation, 1979.

- Matthew, K.A. & Brunson, B.I. Allocation of attention and the Type A coronary-prone behavior pattern. Journal of Personality and Social Psychology, 1979, 37 (11), 2081-2090.
- Rechnitzer, P.A., Yuhasz, M.S., & Paivio, A. Effects of a 24-week exercise program on normal adults and patients with previous myocardial infarction. British Medical Journal, 1967, 1, 734-735.
- Rosenman, R.H., Brand, R.J., Jenkins, C.D., Friedman, M., Straus, R., & Wurm, M. Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8½ years. Journal of the American Medical Association, 1975, 233, 872-877.
- Roskies, E., Spevack, M., & Surkis, A. Changing the coronary-prone (Type A) behavior pattern in a non-clinical population. Journal of Behavioral Medicine, in press.
- Siegel, W., Blomqvist, G., & Mitchell, J.H. Effects of a quantitated physical training program on middle-aged sedentary men. Circulation, 1970, 41, 19-29.
- Sime, W.E. A comparison of exercise and meditation in reducing physiological response to stress. Medicine and Science in Sports, 1977, 9, 55.
- Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. Manual for the State-Trait Anxiety Inventory (STAI). Palo Alto, California: Consulting Psychologists Press, 1970.
- Stoedefalke, K.G. Physical fitness programs for adults. In E.A. Amsterdam, J.H. Wilmore, & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Suinn, R.M. Type A behavior pattern. In R.B. Williams & W.D. Gentry (Eds.), Behavioral approaches to medical treatment. Cambridge, Maine: Ballinger, 1977.
- Suinn, R.M. & Bloom, C. Anxiety management for Type A persons. Journal of Behavioral Medicine, 1978, 1, 25-35.
- Wilmore, J.H. Acute and chronic physiological responses to exercise. In E.A. Amsterdam, J.H. Wilmore, & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.

TABLE 1

SEPARATE ANALYSIS OF COVARIANCE OF THE DEPENDENT MEASURES USING PRE-SCORES
AS COVARIATES (PRE- AND POST-MEANS)

Variable	E		E + Sm		Control		F Value	P
N = 45	Pre	Post	Pre	Post	Pre	Post		
JAS Type A ^a	5.59	5.80	7.48	7.23	7.17	7.40	0.26	0.7708
JAS Factor S ^a	2.60	2.45	0.11	0.75	2.07	2.07	0.87	0.4252
JAS Factor J ^a	5.19	5.17	1.87	2.48	2.05	2.67	0.56	0.5759
JAS FACTOR H ^a	-0.33	1.56	-1.33	-1.51	-1.96	0.60	2.01	0.1463
Trait Anxiety	36.00	34.00	35.53	32.47	32.67	33.07	6.24	0.0043
Systolic BP	122.00	119.60	121.07	117.80	126.93	126.60	4.76	0.0138
Dystolic BP	73.80	73.53	73.93	69.46	76.40	77.47	11.91	0.0001
Resting Heart Rate	68.53	65.57	71.87	67.00	72.67	71.86	7.94	0.0012
Perceived Fitness ^b	4.73	5.13	4.87	5.20	4.33	4.40	4.04	0.0250
Perceived Stress ^b	4.20	3.80	4.07	3.60	4.07	4.33	4.26	0.0209

^aStandard Scores

^bSeven-point Likert Scale: 1 = Not at All to 7 = Extremely

TABLE 2
INDIVIDUAL COMPARISONS OF SIGNIFICANT
DEPENDENT MEASURES

Variable	Probability of t Between:		
	E/E + Sm	E/C	E + Sm/C
Trait Anxiety	0.2230	0.0294	0.0012
Systolic BP	0.4850	0.0281	0.0051
Dystolic BP Rate	0.4350	0.0005	0.0001
Resting Heart Rate	0.8359	0.0020	0.0009
Perceived Fitness	0.9727	0.0165	0.0188
Perceived Stress	0.5759	0.0339	0.0086

APPENDIX A

PROSPECTUS

INTRODUCTION

Exercise conditioning programs have been widely recommended in both the medical literature and the lay press as a means of decreasing the incidence, prevalence, severity or mortality of coronary heart disease (Bonanno, 1977). These claims were initially based on epidemiological studies (Fox & Haskeel, 1968; Frank, Weinblatt, & Shapiro, 1968; Zukel, Lewis, & Enterline, 1959) which suggested an inverse relationship between physical activity and coronary heart disease. Proponents of physical training have grown in numbers and enthusiasm with the appearance of many reports which substantiated an improvement in cardiovascular functional capacity following exercise programs, both in normal persons and in patients with coronary heart disease (Hellerstein, 1968; Rechnitzer, Yuhasz, & Paivio, 1967; Siegel, Blomqvist, & Mitchell, 1970). However, as noted by Bonanno (1977), a cause and effect relationship between physical inactivity and coronary heart disease has never been firmly demonstrated. Furthermore, there is as yet no conclusive proof that chronic physical exercise will in fact prevent this disease or reduce its mortality and morbidity (Fox, Naughton, & Gorman, 1972).

Whether for cardiovascular conditioning or other reasons, increasingly more adult Americans are seen engaging in a variety of physical activities (Stoedefalke, 1977). A national

physical fitness survey conducted for the President's Council on Physical Fitness and Sports (1973) indicated that 55% of adult Americans were participating in some form of physical exercise at that time. Higdon (1978) has recently reported that this participation figure has increased to more than 65% of all adult Americans.

Programs of physical fitness have been established in various community agencies (e.g., Jewish Community Centers, Young Men's/Women's Christian Associations) and universities, paralleling the increasing interest by the American public with physical fitness (Stoedefalke, 1977). Although there is a high degree of diversity in the physical fitness programs offered, they generally attempt to incorporate the four primary components for developing and maintaining fitness in healthy adults: frequency of training, intensity of training, duration of training, and mode of activity (American College of Sports Medicine, 1978; Stoedefalke, 1977).

While research goes on to illuminate the relationship between exercise and coronary heart disease, a behavior pattern identified by Friedman and Rosenman (1974) as Type A has been implicated in the etiology of coronary heart disease. In a series of retrospective and prospective studies, the Type A behavior pattern has been shown to be associated with about twice the prevalence of coronary heart disease as is associated with the Type B or non-coronary behavior pattern (e.g., Jenkins, Rosenman, & Zyzanski, 1974; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975). The Type A behavior

pattern is characterized by extremes of competitive achievement strivings, time urgency, and aggressiveness (Glass, 1977).

Having investigated the interplay of Type A behavior pattern and associated environmental conditions, Glass (1977) reported that the best combination of traditional risk factors for coronary heart disease, for example, cigarette smoking, serum cholesterol level, and hypertension, did not fully explain most new cases of coronary heart disease. He states that stress and the Type A behavior pattern are among the unrecognized variables which have been missing from the predictive equation.

Recently, Friedman (1979) has stated that chronic physical exercise such as jogging is in fact dangerous for those individuals characterized as having Type A qualities, and they should be deterred from participating in these activities. He states that the danger lies in the tendency for Type A individuals to utilize chronic physical exercise such as jogging in the same manner as they do other task functions, making the activity into a competitive venture rather than an activity for leisure and relaxation purposes.

This seems to be in direct opposition to proponents of systematic physical exercise who point to the extensive body of evidence supporting the contention that participation in a regular exercise program results in improving physiological functioning and diminishing health problems, including cardiovascular dysfunctions, for most individuals (e.g., Wilmore, 1977).

However, little research has specifically studied what effect physical exercise has on the Type A behavior pattern. Therefore, this present study proposes to examine the effect physical exercise has on individuals who exhibit qualities associated with the Type A behavior pattern.

REVIEW OF THE LITERATURE

The Type A Behavior Pattern

The Type A personality construct underscores a specific behavioral pattern or style of living which has been shown to be closely associated with the risk of coronary heart disease (Jenkins, Rosenman, & Zyzanski, 1974). Much of the initial work toward an integrated description of the behavior pattern has come from the work of Friedman and Rosenman (e.g., Friedman, 1969; Friedman & Rosenman, 1974; Rosenman, 1975). The pattern is described by Friedman (1969) as "a characteristic action-emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time, and if necessary, against the opposing effects of other things or persons in the same environment..." (p. 84).

Other investigators of the Type A behavior pattern have described this entity as an overt behavioral syndrome characterized by excesses of competitiveness, striving for achievement, aggressiveness, having a sense of time urgency, accelerating common activities, being restless and hostile, dis-

playing explosiveness of speech, having a persistent tenseness of facial musculature and feelings of struggle against the limitations of time and the insensitiveness of the environment (e.g., Brand, 1978; Rowland & Sokol, 1977; Wright, 1975).

The converse of the Type A behavior pattern is identified as Type B, which is marked by the relative absence of Type A characteristics. Jenkins, Rosenman, and Friedman (1967) have stated that Type B subjects are relaxed and more easy going, seldom become impatient and take time to enjoy avocational pursuits. They are not easily irritated and work steadily, but without a feeling of being driven by a lack of time. In addition, they are not preoccupied with social achievements, and are less competitive in their occupational and avocational pursuits. Type B individuals move and speak in a slower and more smoothly modulated style.

The most significant support for the role of the Type A behavior pattern in coronary heart disease comes from the Western Collaborative Group Study (WCGS). Rosenman et al. (1975) reported that over 2,800 men were examined and followed for about 10 years in this longitudinal study, to determine whether the Type A pattern had a causal or a merely associative relationship to coronary heart disease (CHD). Specifically, this study revealed that the Type A factor is not only related to established CHD risk factors including smoking, high blood pressure, and serum cholesterol, but is also related to established risk factors such as catecholamines. The CHD risk ratio revealed by the WCGS between

Type As and Type Bs was approximately 2 to 1. The bulk of the risk carried by the Type A factor was found to be independent of its associations with other known CHD risk factors.

The relationship between the Type A behavior pattern and CHD has not only been supported by actual incidence of CHD in prospective studies, but also by autopsy findings (Friedman, Rosenman, Straus, Wurm, & Kosticheck, 1968) and by at least three angiographic studies from different facilities (Zyzanski, Jenkins, Ryan, Flessas, & Everist, 1976). Furthermore, Rosenman and Friedman's findings have received considerable confirmation by other investigators in the field (Jenkins, 1976).

Glass and his associates (1977) have investigated the psychological characteristics of the Type A behavior pattern under controlled laboratory conditions in an attempt to isolate its specific components. Their experimental studies have systematically determined three overt aspects of Type A: (a) the competitive achievement strivings and the suppression of fatigue, (b) the exaggerated sense of time urgency, and (c) the aggressiveness and hostility.

Burnam, Pennebaker, and Glass (1975) demonstrated that Type As are hard driving individuals who are motivated by the desire for success. In their study a total of 62 males and females subjects were randomly assigned to two experimental treatments, regardless of their location on the Type A - Type B dimension. Subjects were designated as Type A

if they scored above the median for the sample of 62 cases and as Type B if they scored below the median. There were 33 Type As and 29 Type Bs. The task involved solving 240 arithmetic problems within a given time limit. The basic experimental design involved telling half of the subjects, "I will be timing you on these problems, but there is no time limit" (No deadline condition), whereas the other half of the subjects were informed, "You have exactly 5 minutes to do as many of these problems as you can" (Deadline condition). All subjects were in fact allowed 5 minutes in which to solve the problems.

The results showed that Type As attempted more problems than Type Bs in the No deadline condition, whereas the difference between Type As and Type Bs in the Deadline condition was not statistically significant. Comparison between the two experimental treatments indicated that Type As performed at a similar level under Deadline and No deadline conditions, but Type Bs attempted more problems under Deadline than No deadline condition. The data further demonstrated that the achievement drive of Type A individuals produces high levels of effort, even when task demands are not made explicit. Type B subjects, in contrast, appear to respond to the perceived requirement of the situation and perform accordingly.

As noted, one of the unexpected findings of the study was the comparative large number of problems completed by Type Bs in the Deadline condition. It was determined by

Burnam et al. (1975) that Type Bs, will, under some circumstances, behave like Type As insofar as the Type Bs accelerate the pace of their activities in order to master a prescribed task. They note that this may have a profound implication for understanding life in contemporary Western society: Those who can think, perform, and communicate more rapidly than their peers are rewarded, thus encouraging the prevalence of Type A behavior.

In another study, Glass (1977) demonstrated that the achievement striving shown by Type A individuals in structured laboratory situations would also appear in their everyday activities as well. Noting that involvement in multiple activities, numerous community and social commitments, and participation in competitive athletics are often signs of the working adult with Type A behavior pattern, the researcher hypothesized that college-student subjects classified by the student version of the Jenkins Activity Survey (JAS) would also have more of these signs than their Type B peers.

University of Texas undergraduates scoring in the upper and lower fifths of a distribution of JAS scores were selected as the potential subjects. From this group of approximately 100 cases, 46 white males aged 18 to 20 agreed to participate in the study. A questionnaire interview was used to collect relevant information regarding the subjects' past and present involvement in athletics, social, and related extracurricular activities, as well as his past

and current scholastic and athletic achievements.

The results indicated that Type As participated in more college extracurricular activities than did Type Bs, and Type As reported having earned more honors in college than did Type Bs. The study indicated that Type A students, like their older counterparts are more active and involved in a variety of enterprises than Type B students. It underscored the impression of Type A individuals being hard-driving people who set their sights on achievement and success, not on pleasures to be derived from interpersonal pursuits.

The notion that Type As are hard-driving individuals led to the hypothesis that Type As would suppress subjective fatigue and thus persist at a task despite veridical feelings of exhaustion (Friedman, 1969). Walster and Aronson (1967) have found that persons who expected a task to continue for a relatively long period of time tended to suppress feelings of fatigue compared with subjects who expected the task to last a shorter length of time. Carver, Coleman, and Glass (1976) reasoned that this tendency might be stronger among Type As than Type Bs due to the hard-driving and competitive nature of the Type A individual. They hypothesized that the suppression of fatigue would enable Type As to continue to perform at a high level and thus assert mastery over the demands of the task.

A task was chosen for this experiment that was likely to produce veridical feelings of fatigue; that is, subjects

were required to walk continuously on a motorized treadmill at increasingly sharp angles of incline. A total of 21 Texas undergraduates participated in the study, 10 of whom were designated Type A and 11 as Type B. Subjects were selected as Type A if their scores were in the upper 20% of the distribution of 800 cases. The students completed a Balke treadmill test (at a walking pace) while rating their fatigue at 2-minute intervals. Each subject also completed another treadmill test (at a running pace) that was designed to assess maximum aerobic capacity. The results showed that Type As performed to a level closer to the limits of their endurance than did Type Bs. Also Type As suppressed feelings of fatigue to a greater degree than did their Type B counterparts. This was true whether the fatigue ratings were taken as an average over the entire session or examined only toward the end of the session.

Friedman and Rosenman (1974) suggest that one possible reason for the competitive achievement strivings and the suppression of fatigue on part of Type As may be related to a tendency to measure the value of their total personality or character by the number of their achievements. They state that fatigue suppression should have instrumental value in this connection for it aids in the struggle for environmental mastery. The acknowledge of fatigue, on the other hand, would interfere with task mastery, a situation according to the authors that Type As could not tolerate easily.

Carver and Glass (1978) demonstrated that Type As

harbored significantly greater aggressiveness than Type Bs when challenged by appropriate environmental circumstances. Male undergraduates were exposed to a situation that did or did not threaten their sense of competence and mastery. An opportunity was then given to administer an electric shock to the confederate involved in the threat. In Study I, with 23 Type As and 25 Type Bs as determined by the JAS, the researchers tested the hypothesis that Type As would react with enhanced aggressiveness toward another person who impedes and denigrates their efforts to perform a difficult perceptual-motor task. The results showed that the instigation procedure increased aggression among the Type A subjects relative to that of the Type B subjects.

In order to gain additional information on the conditions that elicited aggression among Type As, a replication of the first study was carried out. In Study II, with 38 Type As and 43 Type Bs, the investigators determined to ascertain whether it was the challenge posed by the perceptual-motor task itself that elicited aggressiveness from Type As or whether the aversive interpersonal interaction between subject and confederate was responsible for the effect. The results showed that the full instigation procedure was not necessary to produce heightened aggression among Type As. The researchers reported that the simple frustration of being confronted with a task whose challenge could not be met yielded nearly as much aggression among Type A individuals as did the full instigation procedure.

In contrast, they found the frustration manipulation had no such effect among Type B individuals. The researchers note that the aggressiveness on the part of Type As in these studies again points to a general characterization of Type A as a behavioral style aimed at maintaining control over the immediate environment. They further state that frustration would seem to represent a threat to the Type As' sense of mastery. The researchers conclude that it seemed reasonable that, when frustrated, Type As would seek to regain control over ongoing events with increased effort and aggressiveness.

In a similar fashion, using undergraduate students, the time-urgency component of Type A has been demonstrated in several studies. For example, Type As performed more poorly than their Type B counterparts on a task requiring a low rate of responding for reinforcement (Glass, Snyder, & Hollis, 1974), and were found to judge the lapse of 1 minute more quickly than Type Bs (Burnam et al., 1975).

Distributional Characteristics of Type A Behavior Pattern

Initial studies speculated that the Type A behavior pattern was normally distributed in our country (Rosenman et al., 1964). Until recently, research studies employing the Jenkins Activity Survey (JAS) as the means to differentiate between Type As and Type Bs have almost exclusively focused on white males between the ages of 25 and 65

(Zyzanski, 1978).

One of the largest population containing substantial numbers of both males and females to whom the JAS was administered was the Chicago Heart Association Detection Project in Industry, which examined over 5,000 persons at intake (Waldron, Zyzanski, Shekelle, Jenkins, & Tannebaum, 1977). They found that the Type A behavior pattern to be more prevalent among working men than among working women. However, when Shekelle, Schoenberger, and Stamler (1976) adjusted for the disproportionate distributions of age and occupational levels in the Waldron study, men did not differ significantly in Type A score from women.

Waldron et al. (1977) also found that on the average, employed women were found to display more of the Type A behavior pattern than housewives of the same age, and that women who had been employed outside the home for over half their adult years had higher scores on the Type A scale. In addition, the researchers found that, for both men and women in their study, that higher educational status was associated with higher Type A, Speed-and-Impatience, and Job-Involvement scores.

Generally, age has not been found to be related to Type A scores in those studies where subjects fall within a restricted but older age range. For example, in the Western Collaborative Group Study (WCGS), for men 39 to 59 years of age at intake, no correlation with age was noted for the Type A scale score (Rosenman et al., 1975).

Similar results have been reported for the Polish prevalence study (Zyzanski et al., 1978). However, several studies have shown that if the age range is broadened to include persons as young as 20 to 25 years, modest inverse correlations with age have been observed. For example, Mettlin (1976), in a study of 943 men in five different work organizations, found an inverse relationship with age ($r = -.28$). Shekelle et al. (1976), in the Chicago Heart Association study, found age inversely related to Type A scores for both sexes.

In related research, Haynes et al. (1978) found that in a sample of employed women and men between the ages of 18 to 25, that men had significantly higher Type A scores, although sex differences at older ages were not significant when tested within subsamples equated for education and race.

Most of the studies that have gathered occupational data have found a substantial positive association of occupational prestige with Type A scores (Jenkins, Zyzanski, & Rosenman, 1979). In the WCGS, higher occupational levels were associated with higher Type A scores (Rosenman et al., 1975). In the Buffalo study of five different work organizations, a significant positive correlation was observed between the Type A score and occupational prestige level (Mettlin, 1976). Shekelle et al. (1976), in the Chicago Heart Association study, also found that Type A scores were positively correlated with socioeconomic status, defined in

terms of occupation and education, in each of the four sex and age groups studied.

Similarly, the relationship between the Type A score and level of education have been found to be positively related (Jenkins, Zyzanski, & Rosenman, 1979). In the WCGS, Type A scores were positively associated with level of education (Rosenman et al., 1975). Mettlin's 1976 study of five different Buffalo work organizations and the analysis by Waldron et al. (1977) of the Chicago Heart Association study report similar findings.

In summary, the findings of these studies state that age is not found to be significantly related to Type A scores. However, most of the studies that have gathered occupational data have found a positive correlation between Type A indications and occupational/educational categories, with individuals in professional and managerial occupations tending to more likely have JAS scores indicative of Type A behavior. Finally, studies have failed to show that the prevalence of the Type A behavior is greater in working men than in working women.

Modification of Type A behavior Pattern

While much research has been done to identify the various pathogenic aspects of the Type A behavior pattern, and further, to describe the "risk factor" relationship between this pattern of behaving and coronary heart disease (e.g., Glass, 1977; Jenkins, 1976), little attention

has been given to how this behavior pattern (or any single aspect of it) might be altered so as to reduce the individual's risk for coronary heart disease. Friedman and Rosenman (1974) have stated that it is clear that much of the Type A behavior evidenced by individuals at risk for coronary heart disease is directly related to thought, attitudes, beliefs and philosophies they have regarding their relationship to the world around them, e.g., "I have to hurry and get everything done or people will think I am not organized", and "If I don't work at least 16 hours a day, 7 days a week, I'll not be successful!". Further, Friedman (1979) strongly supports the position that modification of Type A behavior in persons cannot be successfully achieved unless these persons already have suffered some type of heart dysfunction. He gives the following reasons for this viewpoint: (a) The possession of this behavior pattern not only is a source of pride to most of those persons afflicted with it, but its possession also imparts to them some sense of security. They almost always attribute to this behavior pattern the credit for any socioeconomic or professional success they presently possess. As a consequence, they will fear and resist any regimen that aims to modify their behavior pattern. (b) It is very difficult for the Type A subject, who is quite pragmatic, to comprehend how an abstract entity such as the Type A behavior pattern can lead to coronary heart disease. (c) Subjects with severe Type A behavior almost invariably

believe that it will be the other fellow with Type A behavior, not he, who will suffer prematurely from a heart dysfunction.

However, two different sources (Gentry, 1978; Suinn, 1977) suggest how behavior modification techniques could be helpful in teaching the non-coronary involved Type A individuals, as well as post-coronary diseased Type A patients, to change certain aspects of their behavior.

Gentry (1978) provides numerous examples of how the Type A individual can reengineer his/her behavior so that new, non-pathogenic behaviors are followed by reinforcing (positive) consequences. For example, Gentry states that a Type A businessman can schedule fewer people to meet and less work to do in a given time period, or shorten the time allotted for various business activities, so that he/she has frequent "free periods" to devote to past pleasant memories, finishing a pet project that has been left undone for some time, and so forth.

Another approach advocated by Gentry (1978) assists the Type A individual to reengineer their daily schedule to avoid many interpersonal relationships and situations that elicit the pathogenic aspects of the Type A behavior pattern, e.g., feelings of time pressure, hostility, etc. For example, a person might decide not to wear a watch or have a clock in his or her office, and thus, could not be able to constantly refer to an instrument of time, which in Type A individuals generates feelings of being

in a hurry, of being late, of being overcommitted, and of being overwhelmed.

An example of how a response-cost technique can be used to alter certain aspects of Type A behavior is provided by Friedman and Rosenman (1974, p. 264). They advise that: "Whenever you catch yourself speeding up your car to get through a yellow light at an intersection, penalize yourself immediately by turning to the right at the next corner. Circle the block and approach the same corner and signal light again. After such penalization, you may find yourself racing a yellow light a second, but probably not a third time...".

It is Suinn's (1977) belief that two factors contribute to the maintenance of Type A behaviors - reinforcers and stress. He states that there is little doubt that reinforcement plays a major role in preventing behaviors from being extinguished. He points to the fact that on a cultural level, our society offers many inducements and social rewards for display of Type A behaviors and values.

According to Suinn (1977), the second major factor in maintaining Type A behaviors is stress. He differentiates between stress responses prompted by cue conditons external to the person (e.g., being told that you are running behind on your appointments) versus stresses prompted by internal cue conditions (i.e., need to achieve, drive to perform, etc.). Suinn states that the former may be remedied through control or change of the environmental conditions of work; the latter

requiring changes in the person, either behaviorally or emotionally.

Suinn (1977) has demonstrated that the use of stress management/anxiety reduction approaches can be effective in reducing Type A behavior. He describes a variety of direct and indirect approaches to relaxation training that seem to lead to a decrease in coronary-prone behavior. Direct approaches include Jacobsonian muscle relaxation training, biofeedback, transcendental meditation, physical massage, saunas, yoga, and relaxation imagery. Indirect approaches he suggests include music, reading, watching movies and television, recreational sports, and alcohol.

In addition, Suinn (1977) has recommended "thought-stopping" in his treatment of Type A individuals. He notes that certain negative thoughts compete with a state of relaxation, which is the goal of his stress management program, and in fact, these negative thoughts build up physical tension in the Type A individual. Negative thoughts include thoughts about succeeding, worries about having insufficient time, thoughts about being overcommitted and so forth. He states that such thoughts, if left unchecked, lead to increased feelings of stress, a sense of "loss of control", and ultimately, to the overt manifestation of the Type A pattern.

More recently, Suinn and Bloom (1978) found that anxiety management training in healthy Type A volunteers led to a desired change in Jenkins Activity Survey (JAS)

scores measuring coronary-prone tendencies (Hard-driving and in state and trait anxiety indices).

Another report of success in altering Type A behavior using behavioral intervention strategies have been noted by Roskies, Spevack, and Surkis (in press) at the University of Montreal. The researchers used behavioral approaches similar to the stress management training indicated by Suinn with one group of subjects and a second group treated with psychotherapy aimed at facilitating insight into the origins of the Type A behaviors. They found that the subjects given the behavioral approach experienced significantly more change in their Type A behavior than the psychotherapeutic group. In addition, all subjects in this study reported reduction in felt time pressure and greater life satisfaction.

Psychological Stress - Type A Behavior Pattern and Coronary Heart Disease

Psychological stress, according to Lazarus (1974), plays a key role in many illnesses. When people perceive threat, whether that threat is physical (e.g., electric shock) or psychological (e.g., an event which lowers self-esteem), the body mobilizes as part of an effort to cope with the threat. When this mobilization is excessive or prolonged, disease may result. Lazarus suggests that most disease may be stress-related, since the organ systems of the body tend to function poorly under stress-filled conditions. Thus, emotions associated with stress have been viewed as one factor of clinical

importance contributing to the development of coronary heart disease (Folkins & Amsterdam, 1977).

Three general classes of psychological stressors have been studied in connection with coronary heart disease:

(a) general dissatisfaction with various aspects of life (e.g., Jenkins, 1971, 1976; Theorell & Rahe, 1972; Wolf, 1969) (b) chronic or relatively long-term events experienced by the individuals as stressful (e.g., House, 1975; Sales, 1969) (c) acute life events, defined by the individual as well as by the culture as stressful (e.g., Holmes & Masuda, 1970; Holmes & Rahe, 1967).

In addition, psychophysiological research has demonstrated an association between cardiovascular functioning and both acute and chronic environmental stressors (e.g., Kagan, Lacey, & Moss, 1963; Lowm, Vesrier, & Corbalan, 1973; Williams, 1975). Similar relationships seem well established between stress and serum cholesterol (e.g., Brown, Schalch, & Reichlin, 1971; Rahe, Rubin, & Arthur, 1974) and catecholamines (e.g., Mason, 1972; Nestel, Vergheze, & Lovell, 1967).

The processes by which the Type A behavior pattern influences the pathophysiological reactions associated with stress and with the development of CHD have as yet not been fully determined (Williams, 1978). The conceptualization of Type A as a style of responding to environmental stress which is appraised as a threat to the individual's sense of control is seen at present time to have the most support.

Preliminary support for this notion comes from a retrospective study in which Glass (1977) compared coronary patients, non-coronary patients, and healthy, nonhospitalized controls. He found the cardiac patients had higher Jenkins Activity Survey scores than the other two groups. Of greater interest were scores on a so-called Loss Index, a 10-item scale from the Holmes-Rahe Schedule of Recent Experience (1967) that asked a person to describe the incidence of stressful life events during the last year over which s/he had minimal control, e.g., "death of a loved one" or "being fired". Both patient groups were found to have experienced such losses to a greater extent than the nonhospitalized controls.

Such losses as described in Glass's study have been implicated in the arousal of feelings of helplessness (Engel, 1968, 1970), and some research suggests that such a psychic state is a precursor of possible sudden death (Grenn, Goldstein, & Moss, 1972). Recent findings suggest that helplessness-induced stressful life events (i.e., losses) specifically discriminate individuals with illnesses from those without disease (Glass, 1977). Since the coronary patients in Glass's study also had higher JAS scores, it is hypothesized that the interaction between helplessness and Type A may be prodromal to coronary disease events.

Additional research by Glass and his associates (1977) on reactions to controllable versus uncontrollable stress indicated that the Type A individual at first tries harder

than the Type B individual to control highly stressful situations. However, the researchers found that extended experience with lack of control led to a passive behavior on the part of Type A individuals, and to feelings of helplessness and a decline in efforts at mastery by Type As. They have described this pattern of reaction to uncontrollable stress by Type As as an initial hyper-responsiveness followed by subsequent hypo-responsiveness, and manifestation of behavioral signs of helplessness.

Recently, the allocation of attention factor on part of Type As have been studied in relating this process to the pathophysiological reactions associated with stress and with the development of CHD. Matthew and Brunson (1979) report that previous research has demonstrated that Type As fail to report fatigue as well as a variety of other symptoms of illness during task performance. They note that the failure of the Type As to be attentive and to report symptoms contribute to the overall risk of CHD. They state that Type As' failure to report symptoms does not allow them to use symptom elicited by stress as cues to alter their behavior to less stressful forms. The long-term physiological effect of this lack of attentiveness to cues has been studied by Williams (1975). He found that individuals who are described as hyperalert and who exhibit a high level of ability to focus their attention (as Type As) also show correlated increases in the sympathetic nervous system activation. Williams states that if such

activation were to occur repeatedly, it would subject the cardiovascular system to substantial physical loads on a daily basis, which would subsequently lead to various coronary heart dysfunctions.

Thus, experimental and clinical studies have indicated an association between emotional stress, Type A behavior pattern and coronary heart disease. Reviews of the psychological and social precursors of CHD have highlighted a variety of environmental stresses, and physiological responses that are prevalent among people predisposed to and with CHD.

Physical Exercise

Studies have shown that regular participation in a physical exercise program improves overall cardiovascular functioning, increases endurance and work capacity, improves the efficiency of blood circulation and oxygen consumption, improves the rate of metabolism, stabilizes blood pressure, improves muscle tone and firmness, facilitates in the loss of body fat and weight, facilitates a decrease in blood cholesterol, and minimizes the general deterioration of body systems (e.g., Cooper, 1968; Lydiard, 1970; Karpovich & Sinning, 1971; Katch & McArdle, 1977; Wilmore, 1977).

In addition, the relationship between the effects of exercise and aspects of personality has been well studied. The first systematic investigation of the psychological correlates of exercise started in 1953 by Cureton (1963) at the Physical Fitness Research Laboratory, University of Illinois (Folkins & Amsterdam, 1977). Over a 10-year period his

staff studied 2,500 adults who were followed individually through physical conditioning programs. Through interviews and check list data they found that "nervous tension disappears" with the help of a physical exercise program. Cureton was firmly convinced that inactivity has a negative effect on tension release while movement (exercise) relieved tension. However, controlled studies of this observation have not emerged until recently. Cooper's book, Aerobics, further promoted this notion that exercise can relieve stress emotions. He cited numerous cases where exercise was assumed to be the critical factor in controlling or eliminating stress emotions.

Recent studies have now shown that decreases in both state anxiety (defined as the current level of tension and apprehension) and trait anxiety (defined as anxiety-proneness) follow acute physical exercise (e.g., Morgan, 1973; Morgan & Horstman, 1976; Bahrke & Morgan, 1978). These researchers report that anxiety was reduced by those subjects classified as being high-anxious, as well as those falling within the normal range of anxiety. In addition, they also discovered that exercise activity requiring less than 60 to 70% self-imposed maximal heart rate (representing the percent difference between resting and maximum heart rate) does not have a significant influence on reducing the level of anxiety (e.g., Morgan, Roberts, Brand, & Feinerman, 1970).

Other studies have focused on exercise as a natural means of dealing with stress emotions among "normal" adults

and children. In a recent review, Layman (1974) presented several studies which give additional support to the proposition that exercise influences anxiety levels. Karbe (1966), using the Taylor Manifest Anxiety Scale, found anxiety measures were substantially reduced for 92 female college students after a 16-week swimming class, consisting of 40 minutes twice a week. Hanson (1970) found that state anxiety levels of 4-year old children who were assigned to a 10-week movement behavior program were reduced in comparison to a control group that participated in the regular school program.

Several other studies, in addition to Cureton's pioneering work, have been carried out at the University of Illinois on the effects of physical fitness training on anxiety. Popejoy (1967) found improvement in psychological and physiological measures of anxiety (i.e., self-report inventories, blood pressure, heart rate) for 22 previously sedentary women who participated in a 20-week physical fitness program. Jette (1975) studied 75 men who at one time had participated in one of Cureton's early fitness programs, and who had continued an exercise program regularly, or continued irregularly or had discontinued altogether. He gave each group the Cattell's 16 Personality Factor Questionnaire and concluded that the regular exercisers were more tough-minded, prudent, and relaxed, compared to the non-exercisers and to the irregularly continued exercise group.

Ismail and Young (1973) studied 56 middle-aged male faculty members at Purdue University who participated in a

physical fitness program 3 days a week over a 4-month period. Using Cattell's 16 Personality Factor Questionnaire, they compared personality factor scores of 14 low-fitness subjects with the 14 high-fitness subjects, both before and after the training program. The subjects were given a physical fitness test consisting of 2 items taken from the AAHPER Youth Fitness Test (the pull-ups and the 600-yard run) to determine the low- and high-fitness groups. In the pre-test, the high-fitness subjects demonstrated significantly more emotional stability and imagination. In the post-test, the high-fitness group still was more imaginative and unconventional and now was also more confident and unshakable. However, the low-fitness group showed gains in becoming more self-sufficient and resourceful, and no longer demonstrated low emotional stability. Hence, the researchers concluded that lack of physical fitness was related to emotional instability before fitness training, and this relationship disappeared after the fitness training.

Folkins, Lynch and Gardner (1972) studied junior college students in a semester-long jogging course. Forty-two junior college students who took the course and 42 students enrolled in archery and golf courses were compared on psychological measures of anxiety, depression, self-confidence, adjustment, work efficiency, and sleep behavior. In each group, half of the subjects were men and half were women. Improved physical fitness among the joggers was noted from a running time trials and resting heart rate. Using Cooper's

point system (1968), the jogging group as a whole moved from a poor fitness rating to a fair-to-good level of fitness. The other group showed no significant change in their overall level of fitness. Significant differences between the pre-test scores were found on anxiety, depression, self-confidence, adjustment and sleep behavior measures for the jogging group, while no significant changes were found on these variables for the control group.

In another study, Lynch, Folkins, and Wilmore (1973) looked at the effects of exercise on middle-aged men. Thirty-six men (mean age, 46.5) completed a 19-session exercise program, consisting primarily of jogging. A control group of 34 men (mean age, 43.5) did not participate in an exercise program, but completed pre- and post-measures. The Multiple Adjective Check List was used to measure the stress emotions of anxiety, depression and hostility. The joggers showed significantly greater reductions in all three stress emotions as compared to the no-exercise control group. Results of this study indicate that exercise by middle-aged men can provide considerable relief from their stress emotions.

The research on exercise and its effects on stress supports the conclusion that chronic physical exercise, which results in improved physical fitness, does reduce stress emotional levels (Folkins, Lynch, & Gardner, 1972). Folkins and Amsterdam (1977) note that evidence supporting this conclusion has emerged from studies on children, male and female college students, normal adult men, and men with

coronary heart disease. The studies that evaluated exercise effects in some detail also demonstrated that those individuals who were most unfit physically and/or psychologically initially experienced the most improvement from an exercise program.

Clinical Uses of Physical Exercise Activities

Studies examining the relationship of improved physical fitness on mental functioning and psychological well-being have shown numerous results in a wide variety of approaches and settings. Hilyer and Mitchell (1979) studied the effects of systematic physical fitness training combined with counseling on the self-concept of 40 college students. One experimental group received a fitness program consisting of flexibility training and systematic distance running; a second experimental group received the same physical training plus 1-hour per week of group counseling designed to reinforce progress made in the fitness program; and a third group (control) received no physical fitness training or counseling. After a 10-week program the group receiving fitness training and running made a significant gain in self-concept as measured by the Tennessee Self-Concept Scale. The students were divided into low and high self-concept groups for statistical analysis. It was found that the students who received fitness training and counseling and had low self-concept on the pretest measure made the most positive changes in self-concept.

Kostrubala (1977) has used running as a mode of therapeutic work with his psychiatric patients, especially in the treatment of depression, with positive results. In other clinical uses of physical exercise activities, Harris and Hallhaver (1973) found that obesity may be more effectively controlled when treatment includes exercise as well as counseling. Girodo and Pellegrini (1976) report findings in their study that exercise can be a psychological defense against anxiety and depression.

Harper (1979) has developed a model of using running/jogging as a therapeutic intervention in working with college students. In one study, he found that at the end of 14-weeks of jogging, all of the 14 subjects showed increases in their levels of physiological functioning (measured by percent body fat, blood pressure, and heart rate), improved their level of psychological stress (reduction in both state-trait anxiety as measured by the State-Trait Anxiety Inventory), and also showed improvement in their overall self-concept (measured by the Tennessee Self-Concept Scale).

In summary, clinicians are finding that physical exercise activity such as jogging in combination with counseling is effective in dealing with a number of varying psychological problems. However, little recognition has been given to the influences of the Type A behavior pattern in these reported findings.

Theories of Exercise Effect

The psychological and physiological processes by which

physical exercise may afford control and modification of stress have been the subject of recent speculation by researchers in the field of physical fitness and health.' Ismail and Trachtman (1973) presented a general psychological theory to explain this relationship. They suggest that changes occur when an individual confronts a challenge (i.e., strenuous exercise program) and overcomes it. They state that the positive outcome, or mastery of the challenge, provides a sense of accomplishment or self-control. It is their contention that this psychological state allows for more adaptive responses to distressing situations.

Ismail and Trachtman (1973) also present the general viewpoint that psychological changes are the direct effect of physiological and biochemical changes resulting from exercise. They suggest that increased circulation to the brain increases availability of glucose, which is essential to cerebral metabolism. Thus, the availability of glucose through the improvement in oxygen transport is suggested by these researchers as enhancing mental and psychological functioning.

Finally, a physiological cause theory has been built around Selye's theory of stress (Folkins and Amsterdam, 1977). According to Folkins and Amsterdam, Selye promotes the concept that exercise can serve as a therapy for stress because it interrupts the stereotyped response pattern which often contributes to physical and mental illness. In a review of the literature concerning the effect of exercise on the

adrenal glands and the autonomic nervous system, Michael (1957) offered strong support for this idea. The studies point out that adrenocortical activity along with the autonomic nervous system are involved in adjusting to stress. This ability to adjust is helped with exercise. He reports that the evidence indicates that adaptation to exercise produces a degree of protection against emotional stress.

However, due to the limited available data on this subject area, speculation and exploration into other related research areas, for example the impact of the Type A behavior pattern, may assist in more specifically defining the processes by which exercise impacts upon the stress cycle and thereby intercedes in the complex nature of coronary heart disease etiology.

SUMMARY

Medical research has shown the Type A behavior pattern to be a valid and reliable indicator of a future disposition toward the pathogenesis of coronary heart disease (Jenkins, Rosenman, & Zyzanski, 1974). Treatment approaches for affecting change in the Type A pattern of behaving have been empirically studied with positive results in post-coronary diseased Type A individuals (Friedman, 1979). However, little empirical evidence has been collected about effecting changes in non-coronary individuals who demonstrate qualities associated with Type A (Suinn, 1977).

In addition, Dembroski (1978) has stated that although the work of Glass et al. has successfully supported the

construct validity of the Type A concept, that much more research is necessary before a complete understanding of the Type A pattern is established. He states further that one of the priorities for future validity research is the inclusion of subjects who differ in age, sex, education, socio-economic status, etc. Moreover, systematic investigation of behavioral differences between Type A and Type B subjects in natural settings is needed to identify the frequency of Type A behavior and the specific situations or environments that are most likely to evoke or enhance its development. In addition, Dembroski states that minimal data have been collected on the prevalence of the Type A behavior pattern in the general population. He concludes by stating that such research is needed to provide information on the distribution and stability of elements of the Type A pattern in various populations.

Related literature on physical exercise validates the contention that it is an effective self-help method in managing the influences of stress (Folkins and Amsterdam, 1977). Although assorted physiological and psychological variables have been studied in relation to physical exercise, little research has looked at specifically what influence physical exercise has on the Type A individual. With the growing number of Americans increasingly concerned with health, fitness and stress management (Higdon, 1978), as well as the increasing interest, development, and promotion of exercise as part of the treatment approach by mental health profes-

sionals (e.g., Harper, 1979; Kostrubala, 1977), there is a need for research to begin looking at the effect of physical exercise on the Type A behavior pattern.

STATEMENT OF THE PROBLEM

The proposed study will attempt to assess the effect physical exercise has on non-coronary involved individuals classified as being Type A. Additionally, this study proposes to examine the effect of stress management training on Type A individuals involved in a physical fitness program.

METHOD

Subjects

Police Officers from a large mideastern metropolitan area will be used as the subject pool for this study. Thirty volunteer Police Officers, all participating in an on-going physical fitness program sponsored by a community-based agency (YM/WCA), will be randomly assigned to the two treatment conditions, the exercise-only group or the stress management plus exercise group. In addition, 15 volunteer Police Officers, who will not be involved in any physical fitness program throughout the duration of the study, will make up the control group for this study. The 45 subjects needed for this study was determined by performing a power test with alpha set at .05, the desired power at approximately .90, and the degree of difference set at 1.25 standard deviation.

The subjects in this study will be homogeneous as to

sex. Previous research (e.g., Haynes et al., 1978; Shekelle et al., 1976; Waldron et al., 1977) has been inconclusive in noting if any differences between males and females exist in relation to the Type A factors. Therefore, a homogeneous sample, with regard to sex, controls for the possibility of sex being a confounding variable in this study.

Additionally, only those subjects between the ages of 25 and 65 will be used in this study. Studies have reported that there is a higher prevalence of Type A behavior pattern in both males and females within these age boundaries (e.g., Haynes et al., 1978; Waldron et al., 1977). Furthermore, Jenkins, Zyzanski, and Rosenman (1979) state in the JAS manual that the JAS has shown greater sensitivity in measuring the factors associated with Type A behavior pattern within these age limits.

Finally, any subject found to have a history of coronary heart disease or have participated in a prior stress management program within the last 6 months will be eliminated from the study. The ethical principles outlined by the American Psychological Association (1974) will be followed for all participants.

Instruments

The Jenkins Activity Survey - Form C (JAS) is a self-reporting, multiple choice questionnaire of 52 items developed by Jenkins, Zyzanski, and Rosenman (1968, 1971, 1974, 1979) to measure the Type A behavior pattern found to be associated with the risk of coronary heart disease. The JAS

is scored on four scales: (a) the Type A scale, which assesses the multifactorial clinical construct of the coronary-prone behavior pattern, Type A; and (b) three factorially independent components of this construct - 1. Speed and Impatience 2. Job Involvement 3. Hard-driving and Competitive. Jenkins et al. (1979) report that previous research, on the question of whether the 3 factor scores measured related traits or truly independent ones, have shown correlations that indicate that the 3 factor scores of the JAS make relatively independent contributions to the assessment of Type A tendencies.

The JAS was standardized on the more than 2,800 male participants of the Western Collaborative Group Study (WCGS). The participants held middle- to upper-level occupations in ten large corporations in the state of California (Rosenman et al., 1964). The test-retest reliability was determined at one- and four-year intervals, respectively (Jenkins et al., 1974). The results showed about a .65 correlation between testing occasions for the Type A scale and the Job-Involvement and Speed-and-Impatience components of the JAS. The Hard-driving and Competitive component showed a slightly lower (approximately .58) test-retest correlation. Comparison of correlations between one-year and four-year intervals were reported not to be significantly different.

The validity of the JAS in predicting coronary heart disease has received extensive attention. For example, the JAS Type A scale has been found to be consistently related,

retrospectively, to coronary heart disease in seven independent studies in this country and in one European country as well (Feinleib, Brand, Remington, & Zyzanski, 1978). Secondly, the JAS Type A scale has been found to have predictive validity for CHD in the WCGS (Jenkins, Rosenman, & Zyzanski, 1974), thereby demonstrating that a self-administered psychological test based on clinical concepts can predict the future emergence of coronary disease.

The concurrent validity of the JAS has also been investigated. The JAS appears to measure a unique constellation of attributes, since the measurements of the JAS have generally not correlated highly with standard measures of personality (Glass, 1977). The psychological tests that have been used in efforts to determine whether the Type A behavior pattern is related to standard measures of personality have included such instruments as the Thurstone Temperament Schedule, the Gough Adjective Checklist, the California Psychological Inventory, the MMPI, Cattell 16-PF Questionnaire, Rotter's I-E scale, the Test Anxiety Questionnaire, the Guilford-Zimmermans Temperament Survey, the Strong Vocational Interest Blank, and the Thematic Apperception Test. The results showed that the Type A behavior pattern, in general, reflects characteristics independent of those assessed by traditional measures of personality. Glass (1977) reports that the significant correlations obtained in this line of research have usually supported the validity of the Type A pattern. For example, subscales of the various psy-

chological instruments that assessed such dimensions as activity level, speed, achievement, aggression, dominance, and other related characteristics correlated significantly positive with measures of the Type A pattern; while other dimensions (e.g., neurotic anxiety, defensiveness, "Thrill-seeking" scales, etc.) did not.

The construct validity of the Type A behavior pattern has been supported by social psychological laboratory research (Dembroski, 1978). For example, the series of experiments conducted by Glass and his associates have demonstrated that the Type A subjects are more aggressive, more time urgent, more impatient, and more hard-driving than Type B subjects.

Jenkins et al. (1979) report that, in the process of establishing normative indicators for the prevalence of the Type A behavior pattern, the use of the JAS in a variety of social and cultural groups in both the United States and Europe have revealed that individuals in different occupations, regions, and other subgroupings have different mean scores on the test. They state that these findings reflect the different general tendencies toward Type A behavior that prevail in these groups.

The Trait scale of the State-Trait Anxiety Inventory (STAI) developed by Spielberger, Gorsuch, and Lushene (1970) will also be used in this study. The STAI-Trait scale consists of 20 self-report items designed to measure anxiety-proneness. According to Spielberger et al. (1970), trait

anxiety refers "to relatively stable individual differences in anxiety proneness, that is, to differences between people in the tendency to respond to situations perceived as threatening with elevations in A-State intensity...Trait anxiety, like potential energy, indicates differences in the strength of a latent disposition to manifest a certain type of reaction..." (p. 3).

Researchers have utilized the STAI in studying the psychological responses of physical exercise to stress (e.g., Bahrke & Morgan, 1978; Morgan & Horstman, 1976; Sime, 1977). These researchers have shown that physical exercise, which results in improved fitness, does reduce significantly the level of state and trait anxiety associated with non-phobic stress.

The test-retest correlation for the A-trait have been reported by Spielberger et al. (1970) as ranging from .73 to .85. The concurrent validity of the STAI A-trait is given with associations found with the IPAT Anxiety Scale ($r=.76$), the Taylor Manifest Anxiety Scale ($r=.80$), and the Zuckerman Affect Adjective Checklist ($r=.52$ to $.58$) (Spielberger et al., 1970).

In addition, blood-pressure and resting heart rate readings will be used as physiological indices in this study. Further, demographic data will be obtained through a questionnaire. Such information as present work situation, educational level, marital status, age, and perceived levels of stress and fitness will be obtained.

Procedures

Instructions, consisting of an explanation of what will be required from each volunteer and general information about the nature of the study, will be given to all participants. Each subject will be given an informed consent document, a brief pre-assessment questionnaire, the Jenkins Activity Survey (Form C), and the Trait Scale of the State-Trait Anxiety Inventory to complete. Blood pressure and resting heart rate will also be taken at this time.

From those Police Officers pretested, 45 subjects, found to have the highest JAS Type A scale standard score, will be selected for the study. Jenkins et al. (1979) have stated that it is advisable to develop local norms to interpret JAS scores of persons having social characteristics different from the WCGS and other groups that have been studied. Since no prior studies have examined the distribution of the Type A factors in Police Officers, the determination of Type A - Type B'ness will be done after all volunteering Police Officers have been pretested.

Subjects placed in the exercise-only group will receive only the naturally planned physical fitness regime being offered by the instructing facility. The fitness program, named PULSE (people utilizing life-saving exercises), includes walking/jogging, slow stretching and resisting exercises, 45 minutes three days per week minimum (Bickley, 1980).

As with the subjects in the control group, the subjects in the exercise-only group will be contacted only twice,

during the pretesting and at posttest time. Subjects in the stress management plus exercise group will receive the additional stress management seminars in addition to the fitness program. All pretesting will be completed during the first two weeks of the study.

The stress management training seminars will be four 1½-hour sessions which will begin the third week of the study, and will deal with learning effective stress coping methods. The sessions will be both didactic and experiential in nature. However, no direct references to the Type A behavior pattern will be made in the sessions in order to minimize test sensitization effects. The training will incorporate the approaches advocated by Gentry (1978) and by Suinn (1977), i.e., relaxation training, use of imagery, and other cognitive behavior modification techniques, and utilize the training format developed by Weiskott (1980). Additionally, educational information regarding the mechanism and effects of stress, the influence of nutrition and exercise, psychological variables, and the identification of the personal effects of stress will be emphasized.

The duration of the study will be six weeks in length. Following the conclusion of the sixth week, all subjects in the study will be contacted to retake the JAS and the Trait scale of the STAI. In addition, the subjects will also complete a brief port-questionnaire assessing subjective indications of attitude toward participation in the physical fitness program (if applicable), and change in levels of

stress and fitness. Blood-pressure and resting heart rate will also be taken on those involved in the physical fitness program.

Subjects in the control group and the exercise-only group, as well as those who were pretested but not chosen for the study, will be given the opportunity to receive the stress management training at the conclusion of this study. Additional debriefing of the subjects in the study will include providing the participants with the results of the study and an individualized summary report of the results of the two inventories used in the study.

Design and Statistical Analysis

Two treatment conditions, the exercise-only and the stress management plus exercise, and a control group will be used in this study. The design for this study will be the pretest-posttest control group design. The controls for internal and external validity for this design are discussed by Campbell and Stanley (1963).

Campbell and Stanley (1963) and Cronbach and Furby (1970) recommend that change on repeated measures in such a design be analyzed by separate analysis of covariance, with pretest scores covaried against its matching posttest scores. Therefore, separate analysis of covariance (ANCOVA) will be run on the post-measures to test all hypotheses. If any significance is found, Dunn's individual comparison method will be used to test for significant difference among means.

All data will be analyzed by computer programs developed

for social science research and detailed in the Statistical Analysis System (SAS) User's Guide, 1979 edition. Procedures will be the CORR (for correlation) and the GLM (for general linear model analysis of variance and covariance).

Hypotheses

1. The subjects in the exercise-only group will report higher or lower scores than the control group on the measures of Type A, the scale score as well as the 3 component scores, as indicated by the Jenkins Activity Survey (JAS) (Bonanno, 1977; Folkins & Amsterdam, 1977; Friedman, 1979; Glass, 1977; Matthew & Brunson, 1979).

H_{0_1} : There will be no significant difference on measures of Type A between those who are in the exercise-only group and those in the control group.

2. The subjects in the stress management plus exercise group will report lower scores than the exercise-only group and the control group on the measures of Type A, the scale score as well as the 3 component scores, as indicated by the JAS (Friedman & Rosenman, 1974; Suinn, 1977; Suinn & Bloom, 1978; Roskies et al., in press).

H_{0_2} : There will be no significant difference on measures of Type A between subjects who are given the stress management training and those who do not.

3. The subjects in the exercise-only group and the stress management plus exercise group will report less trait anxiety than the control group as measured by the State-Trait Anxiety Inventory (Bahrke & Morgan, 1978; Morgan, 1973; Morgan

& Horstman, 1976).

HO₃: There will be no significant difference on measures of trait anxiety between subjects who are in the exercise-only and the stress management plus exercise groups and the control group.

4. The subjects in the exercise-only and the stress management plus exercise group will report lower blood pressure and resting heart rates than the control group.

HO₄: There will be no significant difference on measures of blood pressure and resting heart rate between those subjects in the exercise-only and stress management plus exercise groups and those subjects in the control group.

Significance of the Study

Statistics on the trend in mortality from coronary heart disease point to this disease continuing to be the leading cause of morbidity and mortality in this country (Borhani, 1977). He reports that the mortality rate from CHD recently has been increasing more rapidly among the younger age (35 to 54) group than those in their sixth or seventh decade of life.

Medical research has shown the Type A behavior pattern to be a valid and reliable indicator of a future disposition toward the pathogenesis of CHD (Jenkins et al., 1974). Also, related literature on physical exercise points to the numerous physiological and psychological benefits, including improved cardiovascular functioning, that can be derived from exercise. However, little research has examined specifically what influence physical exercise has on the Type A behavior

pattern.

The findings of this study, then, may contribute to knowledge concerning the effect of physical exercise on the Type A factors. This study may also shed some light on the practicality of facilitating change in the Type A style of responding in normal subjects. Finally, information about the distributional characteristics of the Type A pattern in a population of Police Officers will be obtained.

REFERENCES

- American College of Sports Medicine position statement on the recommended quantity and quality of exercise for developing and maintaining fitness in healthy adults. Medicine & Science in Sports, 1978, vii-x.
- Bahrke, M.S., & Morgan, W.P. Anxiety reduction following exercise and meditation. Cognitive Therapy & Research, 1978, 2 (4), 323-333.
- Bickley, J. Personal Communication, Central Columbus YMCA, Director of Physical Fitness, May 13, 1980
- Bonanno, J.A. Coronary risk factor modification by chronic physical exercise. In E.A. Amsterdam, J. H. Wilmore & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Bonnano, J.A., & Lies, J.E. Effects of physical training on coronary risk factors. American Journal of Cardiology, 1974, 33, 760-764.
- Borhani, N.O. Epidemiology of coronary heart disease. In E.A. Amsterdam, J.H. Wilmore & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Brand, R.J. Coronary-prone behavior as an independent risk factor for coronary heart disease. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes & M. Feinleib (Eds.), Coronary-prone behavior. New York: Springer-Verlag, 1978.
- Brown, G.M., Schalch, D.S., & Reichlin, S. Patterns of growth hormone and cortisol responses to psychological stress in the squirrel monkey. Endocrinology, 1971, 88, 956-963.
- Burnam, M.A., Pennebaker, J.W., & Glass, D.C. Time consciousness, achievement striving, and the Type A coronary-prone behavior pattern. Journal of Abnormal Psychology, 1975, 84, 76-79.
- Campbell, D.T., & Stanley, J.C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally College Publishing Company, 1963.
- Carver, C.S., Coleman, A.E., & Glass, D.C. The coronary-prone behavior pattern and the suppression of fatigue on the treadmill test. Journal of Personality & Social Psychology, 1976, 33, 460-466.

- Carver, C.S., & Glass, D.C. Coronary-prone behavior pattern and interpersonal aggression. Journal of Personality & Social Psychology, 1978, 36, 361-366.
- Cochran, W.G., & Cox, G.M. Experimental Designs. (2nd Edition) New York: Wiley, 1957.
- Copper, K.H. The new aerobics. New York: Bantam, 1968.
- Cronbach, L.J., & Furby, L. How we would measure change - Or should we? Psychological Bulletin, 1970, 74, 68-80.
- Cureton, T.K. The physiological effects of exercise programs on adults. Springfield, Illinois: Charles C. Thomas, 1969.
- Dembroski, T.M. Reliability and validity of methods used to assess coronary-prone behavior. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes & M. Feinleib (Eds.), Coronary-prone behavior. New York: Springer-Verlag, 1978.
- Dembroski, T.M., & MacDougall, J.M. Physiologic reactions to social challenge in persons evidencing the Type A coronary-prone behavior pattern. Journal of Human Stress, 1977, 3, 2-9.
- Engel, G.L. Sudden death and the "medical model" in psychiatry. Canadian Psychiatric Journal, 1970, 15, 527-538.
- Engel, G.L. A life setting conducive to illness: The giving up - given-up complex. Annals of Internal Medicine, 1968, 69, 293-300.
- Feinleib, M., Brand, R.J., Remington, R., & Zyzanski, S.J. Section summary: Association of the coronary-prone behavior pattern and coronary heart disease. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes & M. Feinleib (Eds.), Coronary-prone behavior. New York: Springer-Verlag, 1978.
- Folkins, C.H., & Amsterdam, E.A. Control and modification of stress emotions through chronic exercise. In E.A. Amsterdam, J.H. Wilmore & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Folkins, C.H., Lynch, S., & Gardner, M.M. Psychological fitness as a function of physical fitness. Archives of Physical Medicine & Rehabilitation, 1972, 53, 503-508.

- Fox, S.M., & Haskeel, W.L. Physical activity and the prevention of coronary heart disease. Bulletin of the New York Academy of Medicine, 1968, 44, 950-967.
- Fox, S.M., Naughton, J.P., & Gorman, P.A. Physical activity and cardiovascular health. Modern Concerns in Cardiovascular Disease, 1972, 41 (4), 17-20.
- Frank, C.W., Weinblatt, E., & Shaprio, S. Myocardial infarction in men. Journal of the American Medical Association, 1968, 198, 1241-1245.
- Friedman, M. Pathogenesis of coronary artery disease. New York: McGraw-Hill, 1969.
- Friedman, M. The modification of Type A behavior in post-infarction patients. American Heart Journal, 1979, 97, 551-560.
- Friedman, M., & Rosenman, R.H. Type A behavior and your heart. New York: Alfred A. Knopf, 1974.
- Friedman, M., Rosenman, R.H., Straus, R., Wurm, M., & Kositchek, R. The relationship of behavior pattern A to the state of the coronary vasculature: A study of 51 autopsied subjects. American Journal of Medicine, 1968, 44, 525-538.
- Gentry, W.D. Behavior modification of the coronary-prone behavior pattern. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes & M. Feinleib (Eds.), Coronary-prone behavior. New York: Springer-Verlag, 1978.
- Glass, D.C., Snyder, M.L., & Hollis, J.F. Time urgency and the Type A coronary-prone behavior pattern. Journal of Applied Social Psychology, 1974, 4, 125-140.
- Glass, D.C. Behavior patterns, stress & coronary disease. Hillsdale, New York: Lawrence Erlbaum Associates, 1977.
- Girido, M., & Pelligrini, W. Exercise-produced arousal, film-induced arousal, and attribution of internal states. Perceptual and Motor Skills, 1976, 42, 931-935.
- Greene W.A., Goldstein, S., & Moss, A.J. Psychosocial aspects of sudden death: A preliminary report. Archives of Internal Medicine, 1972, 129, 725-731.
- Hanson, D.S. The effect of a concentrated program of movement behavior on the affective behavior of four-year-old children at University Elementary School. Unpublished manuscript, University of California, Los Angeles, 1970.

- Harper, F.D. Jogotherapy: Jogging as a therapeutic strategy. Alexandria, Virginia: Douglass Publishers, 1979.
- Harris, M., & Hallhaver, E. Self-directed weight control through eating and exercise. Behavior Research and Therapy, 1973, 11, 523-529.
- Haynes, S.G., Levine, S., Scotch, N.A., Feinleib, M., & Kannel, W.B. The relationship of psychosocial factors to coronary heart disease in the Framingham Study. I. Methods and risk factors. American Journal of Epidemiology, 1978, 107, 362-383.
- Hellerstein, H.K. Exercise therapy in coronary disease. Bulletin of the New York Academy of Medicine, 1968, 44, 1028-1047.
- Higdon, H. Can running cure mental illnesses? - Part one: Running & the mind. Runner's World, January, 1978, 36-43.
- Hilyer, J.C. & Mitchell, W. Effect of systematic physical fitness training combined with counseling on the self-concept of college students. Journal of Counseling Psychology, 1979, 26, 427-436.
- Holmes, T.H., & Masuda, M. Life change and illness susceptibility. Unpublished manuscript, University of Washington, Seattle, 1970.
- Holmes, T.H., & Rahe, R.H. The Social Readjustment Rating Scale. Journal of Psychosomatic Research, 1967, 11, 213-218.
- House, J.S. Occupational stress as a precursor to coronary disease. In W. D. Gentry & R.B. Williams, Jr. (Eds.), Psychological aspects of myocardial infarction and coronary care. St. Louis: Mosby, 1975.
- Howard, J.H., Cunningham, D.A., & Rechnitzer, P.A. Health patterns associated with Type A behavior: A managerial population. Journal of Human Stress, 1976, 3, 24-31.
- Ismail, A.H., & Trachtman, L.E. Jogging the imagination. Psychology Today, 1973, 6, 79-82.
- Ismail, A.H., & Young, R.J. The effect of chronic exercise on the personality of middle-aged men by univariate and multivariate approaches. Journal of Human Ergonomics, 1973, 2, 47-57.
- Jenkins, C.D. Recent evidence supporting psychological and social risk factors for coronary disease. New England Journal of Medicine, 1976, 294, 987-994 & 1033-1038.

- Jenkins, C.D. Psychologic and social precursors of coronary disease. New England Journal of Medicine, 1971, 284, 307-317.
- Jenkins, C.D., Rosenman, R.H., & Friedman, M. Development of an objective psychological test for the determination of the coronary-prone behavior pattern in employed men. Journal of Chronic Disease, 1967, 20, 317-379.
- Jenkins, C.D., Roseman, R.H., & Zyzanski, S.J. Prediction of clinical coronary heart disease by a test for the coronary-prone behavior pattern. New England Journal of Medicine, 1974, 290, 1271-1275.
- Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. Progress toward validation of a computer-scored test for the Type A coronary-prone behavior pattern. Psychosomatic Medicine, 1971, 33, 193-202.
- Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. Manual for the Jenkins Activity Survey - Form C. New York: The Psychological Corporation, 1979.
- Jette, M. Habitual exercisers: A blood serum and personality profile. Journal of Sports Medicine, 1975, 3, 12-17.
- Karbe, W.W. The relationship of general anxiety and specific anxiety concerning the learning of swimming. Unpublished dissertation, New York University, 1966.
- Karpovich, P., & Sinning, W. Physiology of muscular activity. Philadelphia: W.B. Saunders, 1971.
- Katch, F.I., & McArdle, W.D. Nutrition, weight control, and exercise. Boston: Houghton Mifflin, 1977.
- Kostrubala, T. The joy of running. Philadelphia & New York: J.B. Lippincott Company, 1977.
- Lacey, J.I., Kagan, J., Lacey, B.C., & Moss, H.A. The visceral level: Situational determinants and behavioral correlates of autonomic response patterns. In P.H. Knapp (Ed.), Expression of the emotions in man. New York: International Universities Press, 1963.
- Layman, E.M. Psychological effects of physical activity. In J.H. Wilmore (Ed.), Exercise and sports sciences reviews. New York: Academic Press, 1974.
- Lazarus, R.S. Psychological stress and coping in adaptation and illness. International Journal of Psychiatric Medicine, 1974, 5, 321-333.

- Lown, D., Verrier, R., & Corbalan, R. Psychologic stress and threshold for repetitive ventricular response. Science, 1973, 834-836.
- Lydiard, A. Jogging the Lydiard way, anaerobic versus aerobics. New York: U.S. Track and Field Federation, 1970.
- Lynch, S., Folkins, C.H., & Wilmore, J.H. Relationships between three mood variables and physical exercise. Unpublished manuscript, University of Illinois, 1973.
- Mason, J.W. Organization of psycho-endocrine mechanisms: A review and reconsideration of research. In N.S. Greenfield & R.A. Sternbach (Eds.), Handbook of Psychophysiology. New York: Holt, Rinehart and Winston, 1972.
- Mettlin, C. Occupational careers and the prevention of coronary-prone behavior. Social Science & Medicine, 1976, 10, 367-372.
- Michael, E.D. Stress adaptation through exercise. Research Quarterly, 1957, 28, 50-54.
- Morgan, W.P. Influence of acute physical activity on state anxiety. Proceedings of the National College Physical Education Association for Men, January, 1973, 114-121.
- Morgan, W.P., Roberts, J.A., Brand, F.R. & Feinerman, A.D. Psychological effect of chronic physical activity. Medicine and Science in Sports, 1970, 2, 213-217.
- Morgan, W.P., & Horstman, D.H. Anxiety reduction following acute physical activity. Medicine and Science in Sports, 1976, 8, 62.
- Nestel, P.J., Verghese, A. & Lovell, R.R. Catecholamine secretion and sympathetic nervous responses to emotion in men with and without angina pectoris. American Heart Journal, 1967, 73, 227-234.
- Newsletter. President's Council on Physical Fitness and Sports. May, 1973.
- Popejoy, D.I. The effects of a physical fitness program on selected psychological and physiological measures of anxiety. Unpublished dissertation, University of Illinois, Urbana, 1967.
- Rahe, R.H., Rubin, R.T., & Arthur, R.J. The three investigators study: Serum uric acid, cholesterol, and cortisol variability during stresses of everyday life. Psychosomatic Medicine, 1974, 36, 258-268.

- Rechnitzer, P.A., Yuhasz, M.S., & Paivio, A. Effects of a 24-week exercise programme on normal adults and patients with previous myocardial infarction. British Medical Journal, 1967, 1, 734-735.
- Renfrow, N.E., & Bolton, B. Personality characteristics associated with aerobic exercise in adult males. Journal of Personality Assessment, 1979, 43, 261-266.
- Rosenman, R.H. Type A behavior pattern - pro and con. Unpublished manuscript, Harold Brunn Institute, Mt. Zion Hospital and Medical Center, San Francisco, California, 1975.
- Rosenman, R.H., Friedman, M., Straus, R., Wurm, M., Kositchek, R., & Werthessen, N.T. A predictive study of coronary heart disease. Journal of the American Medical Association, 1964, 189, 103-110.
- Rosenman, R.H., Brand, R.J., Jenkins, C.D., Friedman, M., Straus, R., & Wurm, M. Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8½ years. Journal of the American Medical Association, 1975, 233, 872-877.
- Roskies, E., Spevack, M., & Surkis, A. Changing the coronary-prone (Type A) behavior pattern in a non-clinical population. Journal of Behavioral Medicine, (in press).
- Rowland, K.F., & Sokol, B. A review of research examining the coronary-prone behavior pattern. Journal of Human Stress, 1977, 3, 26-33.
- Sales, S.M. Organizational roles as a risk factor in coronary heart disease. Administrative Science Quarterly, 1969, 14, 325-337.
- Shekelle, R.B., Schoenberger, J.A., & Stamler, J. Correlates of the JAS Type A behavior score. Journal of Chronic Diseases, 1976, 29, 381-394.
- Siegel, W., Blomquist, G., & Mitchell, J.H. Effects of a quantitated physical training program on middle-aged sedentary men. Circulation, 1970, 41, 19-29.
- Sime, W.E. A comparison of exercise and meditation in reducing physiological response to stress. Medicine and Science in Sports, 1977, 9, 55.
- Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. Manual for the State-Trait Anxiety Inventory (STAI). Palo Alto, California: Consulting Psychologists Press, 1970.

- Stoedefalke, K.G. Physical fitness programs for adults. In E.A. Amsterdam, J.H. Wilmore & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Suinn, R.M. Type A behavior pattern. In R.B. Williams & W.D. Gentry (Eds.), Behavioral approaches to medical treatment. Cambridge, Maine: Ballinger, 1977.
- Suinn, R.M., & Bloom, C. Anxiety management for Type A persons. Journal of Behavioral Medicine, 1978, 1, 25-35.
- Theorell, T., & Rahe, R.H. Behavior and life satisfaction characteristics of Swedish subjects with myocardial infarction. Journal of Chronic Diseases, 1972, 25, 139-147.
- Waldron, I., Zyzanski, S.J., Shekelle, R.B., Jenkins, C.D., & Tannebaum, S. The coronary-prone behavior pattern in employed men and women. Journal of Human Stress, 1977, 3, 2-19.
- Walster, B., & Aronson, E. Effect of expectancy of task duration on the experience of fatigue. Journal of Experimental Social Psychology, 1967, 3, 41-46.
- Weiskott, G.N. Personal Communication, Ohio State University Counseling and Consultation Service, March 8 & 9, 1980.
- Williams, R.B. Physiological mechanisms underlying the association between psychosocial factors and coronary disease. In W.D. Gentry & R.B. Williams, Jr. (Eds.), Psychological aspects of myocardial infarction and coronary care. St. Louis: Mosby, 1975.
- Wilmore, J.H. Acute and Chronic Physiological responses to exercise. In E.A. Amsterdam, J.H. Wilmore, & A.N. DeMaria (Eds.), Exercise in cardiovascular health and disease. New York: Yorke Medical Books, 1977.
- Wolf, S. Psychosocial forces in myocardial infarction and sudden death. In S. Bondurnat (Ed.), Research on acute myocardial infarction. New York: American Heart Association, 1969.
- Wright, I.S. Cardiovascular diseases: Role of psychogenic and behavior patterns in development and aggravation. New York State Journal of Medicine, 1975, 75, 2128-2132.
- Zukel, W.J., Lewis, R.H., & Enterline, R.E. et al. A short-term community study of the epidemiology of coronary heart disease: A preliminary report of the North Dakota study. American Journal of Public Health, 1959, 49, 1630-1639.

- Zyzanski, S.J. Coronary-prone behavior pattern and coronary heart disease: Epidemiological evidence. In T.M. Dembroski, S.M. Weiss, J.L. Shields, S.G. Haynes & M. Feinleib (Eds.), Coronary-prone behavior. New York: Springer-Verlag, 1978.
- Zyzanski, S.J., & Jenkins, C.D. Basic dimensions within the coronary-prone behavior pattern. Journal of Chronic Diseases, 1970, 22, 781-795.
- Zyzanski, S.J., Jenkins, C.D., Ryan, R.J., Flessas, A., & Everist, M. Psychological correlates of coronary angiographic findings. Archives of Internal Medicine, 1976, 136, 1234-1237.
- Zyzanski, S.J., Wrzesniewski, K., & Jenkins, C.D. Cross-Cultural validation of the coronary-prone behavior pattern. Unpublished manuscript, 1978.

APPENDIX B

CONSENT FORM

AGREEMENT TO PARTICIPATE

I do hereby consent to participate in a research program investigating the relationship between physical exercise and stress management training on individuals participating in a physical fitness program.

I understand that I will be given two paper and pencil inventories - the Jenkins Activity Survey and the Self-Evaluation Questionnaire, and a pre-assessment information sheet to complete. In addition, I understand and agree to have my blood pressure and resting heart rate taken. I further understand that, dependent upon the group to which I am assigned, I will have the opportunity to participate in a 4-session Stress Management workshop dealing with effective management of stress.

I understand that all information provided by me is confidential, and I will not be identified individually in any verbal or written report of the findings of this study.

I understand that if I wish to have a copy of the results of the study as well as a summary of the two inventories, that I will print my name and address in the spaces provided at the bottom of this sheet of paper. The results of the study will be available after September 1, 1980.

I further understand that my participation in the study is completely voluntary and I may withdraw from participation at any time. If I have any questions, I may contact Tuck Saul at 476-5249 (home) or at 422-5766 (office).

(Signature)

(Witness)

(Print Full Name)

(Street Address)

(City and State)

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APPENDIX D

THE TRAIT SCALE
STATE-TRAIT ANXIETY INVENTORY

SELF-EVALUATION QUESTIONNAIRE
STAI FORM X-2

NAME _____ DATE _____

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

		Almost Never	Sometimes	Often	Almost Always
21.	I feel pleasant	1	2	3	4
22.	I tire quickly	1	2	3	4
23.	I feel like crying	1	2	3	4
24.	I wish I could be as happy as others seem to be .	1	2	3	4
25.	I am losing out on things because I can't make up my mind soon enough.	1	2	3	4
26.	I feel rested	1	2	3	4
27.	I am "calm, cool, and collected".	1	2	3	4
28.	I feel that difficulties are piling up so that I cannot overcome them.	1	2	3	4
29.	I worry too much over something that really doesn't matter	1	2	3	4
30.	I am happy	1	2	3	4
31.	I am inclined to take things hard	1	2	3	4
32.	I lack self-confidence.	1	2	3	4
33.	I feel secure	1	2	3	4
34.	I try to avoid facing a crisis or difficulty . .	1	2	3	4
35.	I feel blue	1	2	3	4
36.	I am content	1	2	3	4
37.	Some unimportant thought runs through my mind and bothers me	1	2	3	4

	Almost Never	Sometimes	Often	Almost Always
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and Interests	1	2	3	4

APPENDIX E

PRE- & POST-ASSESSMENT QUESTIONNAIRES

Sub. No. _____

Gr. No. _____

PRE-ASSESSMENT QUESTIONNAIRE

AGE _____ SEX _____ OCCUPATION _____

MARITAL STATUS _____

EDUCATIONAL LEVEL: (Please circle)

Less than High School High School Some College College Grad.

1. Have you attended any stress management training within the last 6 months?

YES _____ NO _____

2. Are you currently participating in any physical exercise/fitness program?

YES _____ NO _____

3. HOW MUCH STRESS (PRESSURES/WORRIES/CONCERNS) ARE YOU EXPERIENCING CURRENTLY IN YOUR LIFE? (Please Circle)

(not stressed at all) 1 2 3 4 5 6 7 (extremely stressed)

4. RATE WHAT YOU CONSIDER TO BE YOUR LEVEL OF FITNESS NOW. (Please circle)

(not physically fit) 1 2 3 4 5 6 7 (extremely physically fit)

Sub. No. _____

Gr. No. _____

POST-ASSESSMENT QUESTIONNAIRE

1. In the last SIX WEEKS, how many exercise sessions did you participate in? (Please circle)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
 19 20 21 22 23 24 25 26 27 28 29 30 more than 30

2. HOW MUCH STRESS (PRESSURES/WORRIES/CONCERNS) ARE YOU NOW EXPERIENCING IN YOUR LIFE NOW? (Please circle)

(not stressed at all) 1 2 3 4 5 6 7 (extremely stressed)

3. RATE WHAT YOU CONSIDER TO BE YOUR LEVEL OF FITNESS NOW.
 (Please circle)

(not physically fit) 1 2 3 4 5 6 7 (extremely physically fit)

4. FROM THE LIST BELOW, CIRCLE 3 ADJECTIVES WHICH BEST DESCRIBES HOW YOUR PHYSICAL FITNESS EXPERIENCE HAS BEEN FOR YOU.

relaxing		challenging
	boring	
	soothing	
intense		frustrating
	calming	enjoyable

APPENDIX F

STRESS MANAGEMENT TRAINING

STRESS MANAGEMENT TRAINING

(Four 1½-hour sessions)

SESSION I:

1. Introduction of leader
2. Overview of the training
 - a. awareness-focused
 - b. experiential
3. Introduction of group members
4. Experiential exercise - breaking down into two small groups / having the participants write "Synonyms for Stress" on newsprint and process.
5. Discussion - relationship of stress to happiness, life expectancy, job satisfaction, productivity, health.
 - a. Selye's definition of stress
 - b. eustress vs. distress / fight vs. flight response
 - c. mythical line of stress response - individual uniqueness
 - d. examples of situations and attitudes tending to set off the stress response
 - e. examples of stress-related illnesses
6. Discussion - components of effective management of stress / promotion of "High level wellness"
 - a. self-responsibility
 - b. environmental sensitivity
 - c. physical fitness
 - d. nutrition
 - e. stress management
 - i. relaxation approaches - direct and indirect
 - ii. time management
 - iii. shouldhood leads to shithood theory / worry-stopping techniques
7. Experiential exercise - relaxation training / deep-muscle relaxation method

Homework for second session: complete Life Event Scale

SESSION II:

1. Warm-up
2. Review of previous points about stress and stress management
3. Discussion - interpret and process homework / Life Event Scale

(stress management training - cont:)

- | | | |
|-----------------------------------|------------|----------------|
| 4. Discussion - sources of stress | on the job | away from work |
| a. recent events | Type I | Type II |
| ongoing conditions | Type III | Type IV |
5. Discussion - types of stress
 - a. cyclical
 - b. A-bomb
 - c. cumulative
 6. Experiential exercise - have participants identify sources of current stress, both personally and professionally, and put on newsprint and process.
 7. Experiential exercise - relaxation training / deep-breathing method

Homework for third session: do "life line" for stress.

SESSION III:

1. Warm-up
2. Discussion - process homework in triads / "life line"
3. Discussion - reactions to stress
 - a. crockpot vs. pressure cooker
4. Discussion - time management
 - a. effective planning
 - b. setting priorities
 - c. flexibility
 - d. time-out periods scheduled
 - e. rewards
5. Discussion - worry-stopping techniques
 - a. thought-stopping
 - b. what if - so what if
 - c. worry time
 - d. problem-solving
 - e. worry box
6. Experiential exercise - relaxation training / guided imagery method

SESSION IV:

1. Warm-up / centering-creative body movement exercise

(stress management training - cont:)

2. Discussion - nutrition and diet
 - a. variability of individual needs
 - b. self-exploration of eating habits
3. Discussion - lifestyle and stress
 - a. introduction of the "triangle" concept / sides of the triangle representing leisure, work, relationship.
4. Experiential exercise - guided fantasy / ideal lifestyle in the future.
5. Discussion - behavioral goal setting / shortterm and long-term in regards to better stress management and more positive lifestyle.
6. Experiential exercise - relaxation training / cue-induced relaxation method
7. Summary and termination

APPENDIX G

INTRODUCTORY INFORMATION SHEET

INTRODUCTORY INFORMATION
CONCERNING THE STUDY

My name is Tuck Saul and I am looking for people to take part in a study dealing with what effect physical exercise and stress management training have on individuals participating in a physical fitness program.

Subjects must be male, and need to be between the ages of 25 and 65. In addition, subjects should not have a history of any heart problems nor have participated in any prior stress management training in the last 6 months.

All subjects will be given an informed consent form, a participant information sheet, a pre-assessment questionnaire, and two inventories to complete - the Jenkins Activity Survey and the Self-Evaluation Questionnaire. In addition, blood pressure and resting heart rates will also be taken. It will take approximately 20 minutes to fill out all the items. A coded numbering system will be used to assure that confidentiality is maintained. Only group means will be reported in the study and no individual results will be given to other than the participating persons.

Some of you will be asked to participate in a Stress Management Training program. The training program will consist of four 1½-hour sessions beginning the third week of the study. The sessions will be both conversational and practice-oriented in nature. The training will incorporate educational information regarding the mechanism and effects of stress, the influence of nutrition and exercise, psychological variables, and the identification of the personal effects of stress will be emphasized. Other methods such as relaxation training will be presented.

Others of you will be asked to retake the same two inventories & a post-assessment questionnaire at the end of the six week period. Blood pressure and resting heart rate readings will also be taken at this time.

All subjects will be able to receive the results of the study as well as a summary of the two inventories.

If you are interested in volunteering, please fill-out the accompanying packet and return.

APPENDIX H

SUBJECT CHARACTERISTICS OF
TOTAL SAMPLE

SUBJECT CHARACTERISTICS OF THE SAMPLE POOL

N = 97

<u>Variable</u>	<u>$\bar{X}$</u>	<u>S.D.</u>	<u>Min. Value</u>	<u>Max. Value</u>
Age	32.04	7.21	25.00	58.00
Marital Status ^a	1.78	0.50	1.00	3.00
Educational Level ^b	3.32	0.74	2.00	4.00
JAS Type A ^c	- 0.63	8.43	-15.80	18.20
JAS Factor S ^c	- 3.32	9.66	-22.00	16.80
JAS Factor J ^c	- 0.93	8.40	-20.60	14.20
JAS Factor H ^c	- 4.66	8.97	-27.40	18.20
Trait Anxiety	33.42	7.06	21.00	53.00
Level of Fitness ^d	4.46	1.11	1.00	7.00
Level of Stress ^d	3.81	1.43	1.00	7.00
Blood Pressure Systolic	121.98	10.60	100.00	160.00
Blood Pressure Dystolic	74.32	8.34	60.00	99.00
Resting Heart Rate	69.76	9.63	50.00	96.00

^aMarital Status 1=Single 2=Married 3=Divorced 4=Separated

^bEducational Level 1=Less Than H.S. 2=H.S. Grad. 3=Some College
4=College Grad.

^cStandardized scores

^dSeven point Likert Scale 1=Not at all to 7=Extremely