FACTORS RELATED TO EXERCISE BEHAVIOR:

PERSONALITY FACTORS AND DEMOGRAPHIC

CHARACTERISTICS

BY

CATHY FURLONG

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1974

Master of Science
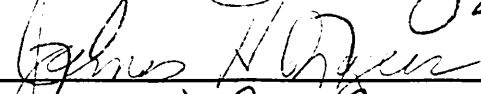Oklahoma State University
Stillwater, Oklahoma
1976

Submitted to Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
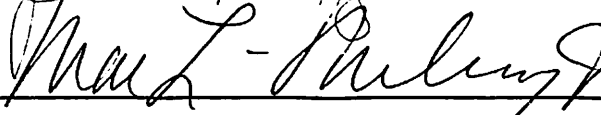the Degree of
DOCTOR OF PHILOSOPHY
December, 1994

FACTORS RELATED TO EXERCISE BEHAVIOR:
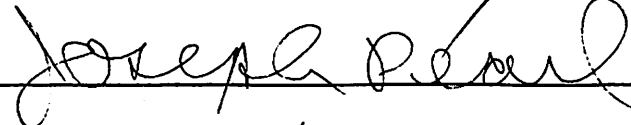
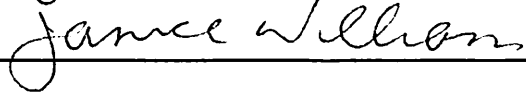PERSONALITY FACTORS AND DEMOGRAPHIC

CHARACTERISTICS

Thesis Approved:

_____
Thesis Adviser

_____

_____

_____

_____

_____

_____
Dean of the Graduate College

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to Dr. John Romans for his guidance and support throughout this dissertation process. I would also like to thank Dr. Janice Williams for her help with the statistical design and methodology. And of course, I wish to thank my committee members whom I felt honored to have on my committee: Dr. Al Carlozzi, Dr. Joseph Pearl, Dr. James Rogers, and Dr. Mac McCrory.

Special thanks to the people who lent me their time and expertise. Namok Bryant for her wizardry on the data entry and statistics, Edd and Gail Hill who solved my computer dilemmas, and Maureen McCarthy who helped me organize pages and pages of writing.

And finally, the people I am most indebted to - my friends and family. Thank you Camille, Mary, and Paula for putting up with my griping and complaining, and for your continued words of encouragement! Thank you Jan and Lisa for being a better friend than I these last couple of years. And finally, to the two people who made this journey possible: my mother Betty, for believing in a college education for her daughters, and my partner Karen who without her support this journey would not have been possible. I extend a sincere thank you to you all!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Research on exercise suggests that a number of
important health benefits are associated with regular
physical exercise. Reductions in cardiovascular disease,
hypertension, osteoporosis, and diabetes (Powell, 1988;
Siscovick, LaPorte, & Newman, 1985) have all been documented
in exercise adherence research. Exercise has been
associated with increases in feelings of well-being (Morgan,
1985; Morgan, Shephard, & Finucane, 1984), self-esteem
(Folkins & Sime, 1981; Hughes, 1984; Sonstroem, 1984),
motivation (Dishman & Steinhardt, 1988; Dubbert, Stetson &
Corrigan, 1991; Knapp, 1988; Raglin, Morgan, Luchsinger,
1990), and self concept (Kendzierski, 1990). Exercise has
also been associated with decreases in depression and
anxiety (Abbott, Peters & Vogel, 1990; Giese & Schomer,
1986; Miller & Wikoff, 1989; Oldridge & Streiner, 1990;
Thompson & Meddis, 1990).

However, since the majority of Americans do not engage
in sufficient amounts of physical activity to experience
many of the health benefits (Sallis, Haskell, & Wood, 1986)
scientific interest in developing an understanding of the
correlates of physical activity has grown. Such research

1

might be used in establishing the groundwork for development of a general model of adherence behavior, defined as the maintenance of a specific behavior over time. This length of time has been defined variously in the literature from six, twelve, to twenty four months. For purposes of this study, adherence is defined as six months. Individuals who are still active after six months are likely to remain active a year later (Oldridge, 1982). Defining adherence in this study as six months or more captures those individuals most likely to continue to adhere to an exercise regimen.

Adherence to exercise has typically followed the same pattern as compliance to other medical regimen. The relapse rates following treatment for the major addictions of smoking, alcoholism, and heroin dependence all follow curves similar to those representing adherence to voluntary exercise programs across 18 months. These curves are characterized by a rapid and substantial decrease in the percentage of participants during the initial three to six months, and a fairly stable plateau across the next 12 to 15 months (Baekeland & Lundwall, 1975). This pattern of similarity across various behaviors suggests an underlying construct operating in adherence behavior. Research is needed to determine whether this underlying construct exists, and if it does, the nature of its existence, and its application to exercise adherence.

Additionally, there is a need for research that tests hypotheses derived from theoretical models and that has

clear implications for intervention programs (Dishman, Sallis, & Orenstein, 1985). Intervention programs aimed at increasing adherence to exercise regimen cannot be defined or implemented until the behavioral correlates of participation and adherence are identified and subsequently managed. The first part of this study is a review of the scientific literature on known correlates of initiated and sustained physical activity. Research pertaining to psychological models which have attempted to provide answers about who will exercise, why, and for how long is also included. Finally, the problems and shortcomings in current research are discussed, providing a foundation from which future research hypotheses related to exercise adherence can be explored.

Definitions of Terms

The following are definitions of terms used in this study.

Activity Characteristics. Activity characteristics refers to the mode, frequency, and intensity of the activity undertaken.

Adherence Behavior. Adherence behavior is defined as the maintenance of a specific behavior over time. The amount of time has been variously defined in the research literature. For this study, adherence is defined as six months or more.

Adherers. Adherers are defined as individuals who have

exercised six months or longer.

Body Mass Index (BMI). The Body Mass Index (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972) is a measurement of obesity, calculated as the ratio of weight to the square of height. Correlates of Physical Activity. Correlates of physical activity and exercise are those variables that are believed to contribute to regular physical exercise. These variables are often divided into three categories, Personal characteristics, Environmental characteristics, and Activity characteristics.

Environmental Characteristics. Environmental factors include spouse and family support, perceived available time, access to facilities, peer influence, cost, climate, et cetera.

Exerciser. Exercisers are defined as individuals who exercise at least three times per week.

Moderate Exercise. Moderate to light activities are usually defined as climbing stairs for exercise instead of taking the elevator, mowing the lawn, golfing, calisthenic exercises, walking on your lunch hour, all requiring an energy expenditure in the range of 3-5 metabolic equivalents (METs). One MET is the energy expended by a person while sitting at rest (Sallis et al., 1985).

Non-Adherers. Non-adherers are individuals who have exercised less than six months.

Non-Exerciser. Non-exercisers are defined as individuals who either do not exercise at all, or who

exercise less than three times per week.

Personal Characteristics. Personal characteristics are defined as past or present knowledge, attitudes, behaviors, personality characteristics, biomedical traits, and demographic factors that may influence the adoption and adherence to exercise behavior.

Spontaneous Program. A spontaneous program is an exercise program whereby the exerciser's participation is not supervised. Research in this type of setting relies upon self-reported exercise.

Supervised Program. A supervised program is an exercise program whereby the exerciser's activity is directly observed and/or assisted. Research in this setting often utilizes both self-reports and reports of program leaders.

Vigorous Activity. Vigorous activity is defined as the equivalent of continuous activity at 60-70 per cent of aerobic capacity for 20 minutes, at least three times per week.

Research Questions

Based upon the review of related literature, the following research questions were formulated:

1. Can exercisers and non-exercisers be differentiated on the basis of personal characteristics? Personal characteristics utilized in this study include the following: age, sex, marital status, income,

education, smoking habit, body mass index, and measures of motivation, self-esteem, and locus of control.

2. Which environmental characteristics relate to an individual's ability to exercise? Environmental characteristics used in this study include the following: location of exercise facility in terms of convenience to home and work; importance of social support including spouse, friend and/or colleague; purpose of exercise; and supervised versus spontaneous exercise setting preference.

3. Can adherence to exercise be predicted by motivation, locus of control, and/or self-esteem?

Organization of the Study

This study is organized into five chapters. Chapter I has served as an introduction to the research topic. This chapter has explained why the research is important and how the results might be useful to the profession of psychology. Problem statements were given, the conceptual terms were defined, and the research questions of the study were stated. Chapter II contains a review of the current literature related to this study. In Chapter III, the methods used in this study are presented. Among the elements covered are descriptions of the subjects, instruments, procedures, and research design. In Chapter IV the results from the statistical analyses are reported. In

Chapter V, the study is summarized, and conclusions and recommendations for future research are drawn from the statistical analyses.

CHAPTER II

REVIEW OF CURRENT LITERATURE

The benefits of habitual exercise have been well documented in terms of both psychological and physical health. Reductions in cardiovascular disease, hypertension, osteoporosis, and diabetes (Powell, 1988; Siscovick, LaPorte, & Newman, 1985) have all been documented in exercise adherence research. Exercise has been associated with increases in feelings of well-being (Morgan, 1985; Morgan, Shephard, & Finucane, 1984), self-esteem (Folkins & Sime, 1981; Hughes, 1984; Sonstroem, 1984), motivation (Dishman & Steinhardt, 1988; Dubbert, Stetson & Corrigan, 1991; Knapp, 1988; Raglin, Morgan, Luchsinger, 1990), and self concept (Kendzierski, 1990). Exercise has also been associated with decreases in depression and anxiety (Abbott, Peters & Vogel, 1990; Giese & Schomer, 1986; Miller & Wikoff, 1989; Oldridge & Streiner, 1990; Thompson & Meddis, 1990).

Despite these benefits, approximately 50 percent of those who begin a program of regular exercise drop out within a year (Dishman, Sallis, & Orenstein, 1985). Similarities between dropout patterns in exercise programs and programs of psychotherapy, as well as drug, alcohol, and

smoking treatment, and hypertension control (Baekeland & Lundwall, 1975) suggest that adherence to a behavior change might operate similarly across various health care issues. The relapse rates following treatment for the major addictions of smoking, alcoholism, and heroin dependence all follow curves similar to those representing adherence to voluntary exercise programs across 18 months. These curves are characterized by a rapid and substantial decrease in the percentage of participants during the initial three to six months, and a fairly stable plateau across the next 12 to 15 months (Baekeland & Lundwall, 1975).

This pattern of similarity across various behaviors suggests an underlying construct operating in adherence behavior. Research is needed to determine whether this underlying construct exists, and if it does, the nature of its existence, and its application to exercise adherence. The critical issue confronting health-care providers is the need for an improved understanding of adherence, or relapse prevention, as it relates to behavioral health changes.

The purpose of this literature review is to examine conceptually relevant factors (personal and environmental) and determine their relationship to exercise adoption and adherence. The first part of this review examines the scientific literature on known correlates of initiated and sustained physical activity. The second section reviews the research pertaining to theoretical psychological models which have attempted to discriminate between exercise

adherers and dropouts. Finally, these findings will be summarized and conclusions made with an eye to future areas of research.

Known Correlates of Physical Activity

Dishman, Sallis, & Orenstein (1985) and King, Blair, Bild, Dishman, Dubbert, Marcus, Oldridge, Paffenbarger, Powell, and Yeager (1992) reviewed available research on correlates relating to the adoption and maintenance of physical activity. They provided a useful categorization system, identifying correlates as either personal or environmental factors related to exercise. In addition, they distinguished between exercise settings, separating supervised settings from non-supervised or spontaneous exercise settings.

Personal characteristics were defined as past or present knowledge, attitudes, behaviors, personality characteristics, biomedical traits and demographic factors that may influence exercise habits. Environmental characteristics were defined as physical and social environmental factors that have been associated with exercise and physical activity. Examples include family and spouse support, co-worker support, availability of time to exercise, and convenience of exercise facility. While the majority of available studies reviewed by these authors (Dishman, Sallis, & Orenstein, 1985; King et al., 1992) focused on the correlates of vigorous leisure- time physical

activity, their results also related findings relevant to
light and moderate physical activities. More recent
research indicates that the health advantages of
vigorous physical activity appear to be relative, rather
than absolute and that light to moderate physical activity
can lead to improved health (Leon, Connell, Jacobs, &
Rauramaa, 1987). Moderate to light activities are usually
defined as climbing stairs for exercise instead of taking
the elevator, mowing the lawn, golfing, calisthenic
exercises, walking on your lunch hour et cetera, all
requiring an energy expenditure in the range of 2-4
metabolic equivalents (METs) (Sallis, Haskell, & Wood,
1985). This index is calculated as the work metabolic
rate/rest metabolic rate ratio (MET). Exercise and work
intensity is frequently described in the literature as
varying degrees of MET. MET values are assigned to the
various activities based on energy cost values given in the
literature, notably in Taylor, Sallis, and Needle (1985),
Passmore and Durnin, (1955), and Katch and McArdle, (1977).
Sleep is estimated as 1 MET, light activity as 1.5 METs,
moderate activity as four METs, and vigorous activity as six
METs.

The reviewers (Dishman, Sallis, & Orenstein, 1985; King
et al. 1992) also distinguished between spontaneous activity
and supervised participation. Supervised participation is
defined as occurring in a setting where exercise can be
supervised, as opposed to a spontaneous setting where

individuals exercise independent of anyone's instruction or supervision. Studies involving supervised settings generally rely upon both self-reports of exercise and reports of program leaders, while studies utilizing spontaneous settings rely upon self-reports only.

Personal Characteristics

In terms of personal characteristics, Table 1 on page 13 summarizes the repeatedly documented correlates which have been demonstrated to increase or decrease the probability of exercise. While only those variables which have been identified consistently (multiple studies yielding similar results) through research as influential to exercise are utilized in this study, it is also informative to briefly consider those variables which have not effectively or consistently predicted exercise adoption or adherence.

Correlates Yielding Inconsistent Results. Past participation in school athletics has not been a reliable predictor of continued exercise (i.e. adherence) as an adult (Dishman, 1988; Morgan, 1985), nor has knowledge related to health benefits of exercise (Dishman, 1982, 1985; Lindsay-Reid, & Osborn, 1980; Meyer, 1980; Sallis, Hovell, Hofstetter, & Faucher, 1989). Perceived physical competence, or one's self-perception of capability to exercise has also yielded no association with exercise adoption or adherence (Dishman, 1982; Morgan 1985). Personality traits which have yielded inconsistent data

include extroversion (Blumenthal, 1982; Cox, 1984); ego-strength (Blumenthal, 1980; Dishman, & Ickes, 1981) and Type A (Oldridge, 1982; Rejeski, Morley, & Miller, 1984; Shephard, & Cox, 1980). Although these findings are too sparse to make definitive conclusions, it is clear that those personal characteristics mentioned above, when compared to those personal variables that have yielded consistent results, do not play as important a role in exercise adoption and adherence.

TABLE I

CORRELATES OF PROBABILITY OF EXERCISE

Correlates	Supervised program	Spontaneous program
Personal Characteristics		
Past program participation	+	
High risk for coronary heart disease	+	
Perceived health benefit	+	
Educational Level		+
Self-motivation	+	
Behavioral skills	+	
Blue-collar occupation	−	
Smoking	−	
Overweight	−	
Mood Disturbance	−	−
Environmental Characteristics		
Spouse support	+	
Perceived available time	+	
Access to facilities	+	
Disruptions in routine	−	
Family influences		+
Peer influence		+

KEY: + = repeatedly documented increased probability of exercise; −= repeatedly documented decreased probability of exercise.

Personal Characteristics: Demographics.   There is strong evidence that activity decreases with advancing age (Montoye, 1975; Sallis, 1986; Stephens, Jacobs, & White, 1985). Limited data in older adults suggest that this decline continues after age 50 (Reaven, McPhillips, Barrett-Connor, & Criqui, 1990), with progressively larger proportions of men and women reporting that they get no light or moderate physical activity through age 80 (Caspersen, & DiPietro, 1991).

Most studies have found lower vigorous activity levels among women than men, particularly at younger ages (Sallis, Haskell, & Wood, 1985; Sallis, Hovell, Hofstetter, & Elder, 1990). Among older adults, gender differences, though somewhat smaller than at younger ages, persist (Sallis, Haskell, & Wood, 1985). However, when light and moderate activities are included in the determination of regular leisure-time physical activity levels, the gender difference diminishes or disappears (Stephens, Jacobs, & White, 1985).

Smoking has been associated with higher dropout rates from vigorous levels of exercise (Cox, 1984; Dishman, Sallis, & Orenstein, 1985; Fielding, 1982; Oldridge, 1982, 1983;) and with poor adherence to cardiac rehabilitation exercise programs (Hedback, & Perk, 1987; Oldridge, Donner, Buck, & Jones, 1983; Oldridge, & Striner, 1990; Stegman, Miller, & Hageman, 1987). Overweight persons were found to be less likely to continue a fitness program (Council on Scientific Affairs, 1989; Dishman, 1981; Dishman & Ickes,

1981; Kind, & Tribble, 1991). Obese persons are also less likely to respond to alternative activity programs (Brownell, Stunkard, & Albaum, 1980). Over-weight or obese men and women are less likely to participate in mild walking than normal-weight individuals (Brownell, Studkard, & Albaum, 1980).

Studies show remarkable consistency in finding that level of education is positively associated with leisure-time physical activity (Ballard-Barbash, Schatzkin, & Albanes, 1990; Folsom, Caspersen, & Taylor, 1985; Schoenborn, 1986; Stephens, Jacobs, & White, 1985). In spontaneous programs, consistent findings have indicated that well-educated persons are more likely to participate in leisure exercise, but less likely to participate in work-related physical activity (Ballard-Barbash, Schatzkin, & Albanes, 1990; Folsom, Caspersen, & Taylor, 1985; Mathews, Kelsey, & Meilahn, 1989). The relationship between occupation and physical activity level is well established in the research literature. Workers with heavy occupational levels of physical activity are less likely to participate in leisure-time physical activity than are white collar-employees (King, Carl, Birkel, & Haskell, 1988; White, Powell, Hogelin, & Gentry, 1987). Blue collar occupation and low social class have been associated with poor adherence during and following completion of an exercise program in most studies (Oldridge, 1988, 1991).

Personal Characteristics: Cognitive Factors. A variety

of cognitive factors have been included in research involving personal correlates of exercise. Knowledge of and belief in the health benefits of physical activity appear to motivate initial involvement only in exercise programs (Sallis, Haskell, & Fortmann, 1986; Sallis, Hovell, Hofstetter, & Faucher, 1989; Teraslinna et al., 1969). No evidence supports the idea that increased knowledge about exercise leads to enhanced participation or adherence in spontaneous programs (Daltroy, 1985; Sallis, Haskell, & Fortmann, 1986; Scalzi, Burke, & Greenland, 1980). In fact, less than five percent of the population believe that more information on fitness benefits would be likely to increase their participation (Dishman, 1982).

Alternatively, those who believe their health is poor, even if unconfirmed by medical report, are unlikely to enter or adhere to an exercise program, and if they do, they are likely to perform little exercise (Dishman, 1982; Oldridge, & Spencer, 1985; Sallis, Haskell, & Fortmann, 1986). Physical activity produces results that can encourage or discourage subsequent participation. For example, perceived discomfort during an exercise program has been reported among women who drop out (Oldridge, 1983). Those who believe exercise has little value for health and fitness and also believe health outcomes are out of their control have been found to exercise less frequently and to drop out sooner in fitness-related programs (Dishman, 1980, 1982; Dishman, & Steinhardt, 1990).

Intentions to be physically active have consistently failed to predict subsequent participation (Godin, Shephard, & Golantonio, 1986; Godin, Valois, Shephard, & DeSharnais, 1987). Self-reporting intentions to initiate an exercise regimen do not predict adoption of exercise. However, self-efficacy, or one's belief of being able to successfully perform a specific activity or behavior (Bandura, 1977) has been associated with exercise participation (Kendzierski, 1990; Oldridge, & Spencer, 1985; Sallis, Haskell, & Fortmann, 1986). Self-efficacy ratings have also predicted the adoption of vigorous activity in men and the adoption and maintenance of moderate activity for men and women (Desharnais, Bouillon, & Godin, 1986; Sallis, Haskell, & Fortmann, 1986; Weinstein-Garcia, & King, 1991).

Reports of subjective feelings of enjoyment and well-being seem to be strong motives for continued participation (Morgan, Shephard, & Finucane, 1984; Teraslinna et al., 1969). Numerous studies show that exercise is associated with positive mood and psychological functioning (Morgan, 1979; Taylor, Sallis, & Needle, 1985), but the behavioral meaning of this relationship is not yet known. Some exercisers use activity as a coping strategy for stress (Dishman, 1986), and positive feelings associated with activity may be associated with an excessive dependence in certain types of people (Inger & Dahl, 1979).

Personal Characteristics: Past Exercise Participation. In supervised programs where activity can be directly

observed, past participation in a program is the most reliable correlate of current participation, accounting for 30% to 50% of the variance in participation in activity across the first few months. This finding holds for men and women (Dishman, 1982; Oldridge, 1982).

Data on the impact of previous exercise activity not performed in a supervised situation is less clear. In other words, those individuals preferring spontaneous exercise settings do not self-report previous exercise habits as frequently as their supervised-preferring counterparts. In programs for male cardiac rehabilitation patients, routine walking and active leisure reported as occurring in a supervised setting predict participation in other supervised programs, but the intensity, duration, and frequency of self-reported preprogram activity does not. (Dishman, 1982; Oldridge, 1982). Although one cross-sectional study (Harris, 1970) found that active male participants in adult fitness programs are likely to have had a background in sports, no study has found a relationship between adherence to cardiac exercise programs and participation in interscholastic or intercollegiate athletics (Dishman, 1981).

Personal Characteristics: Personality Traits. Personality traits related to exercise adoption and adherence have been studied in an attempt to determine who will exercise, why, and for how long. An increasing amount of study over the past 10 years has failed to answer these

questions (Cox, 1984; Dishman, 1982, 1985; King et al., 1992; Morgan, 1977). A majority of recent studies have focused on adherence (Sonstroem, 1988, 1989). Once enrolled in an activity program, who are the people who will remain in the program? Who will drop out and why? Although the role of personality in exercise adoption and adherence has not been systematically studied, research on psychological and behavioral attributes and traits that show reasonable stability over time and across situations have been examined (King, et al., 1992).

One fruitful area of research has focused on the role of the self in exercise behavior (Sonstroem, 1988). Research involving variables such as self-esteem, self-efficacy, self-motivation, and locus of control suggests that the self is an important variable in exercise behavior. Feelings of confidence, mastery, competence, and self-esteem are traditionally mentioned as anticipated outcomes of exercise participation (Sonstroem, 1984).

Participation in exercise programs has been associated with improved self-esteem scores (Folkins, & Sime, 1981; Hughes, 1984; Sonstroem, & Morgan, 1989). Because of its intuitive appeal for defining anticipated psychological benefit, self-esteem has been regarded as the paramount variable in exercise-personality research (Sonstroem, 1984). Sonstroem reviewed 16 studies testing the hypothesis of enhanced self-esteem through exercise, and concluded that significant increases in self-esteem are related to exercise

participation. Dishman (1988) points out the difficulty of understanding the mechanisms involved, due to experimental limitations, and the difficulty in operationally conceptualizing self-esteem theory.

Sonstroem and Morgan (1989) developed a working model of examining self-esteem change through competency development and generalization. They conceived the model as a tool for examining both the nature of self-esteem change and, ultimately, the mechanisms responsible for this change. Adopting Shavelson, Hubner, and Stanton's (1976) multifaceted structure for self-esteem, they divided general self-concept into academic and nonacademic second-order levels. The nonacademic self-concept is further partitioned into social, emotional, and physical self-concepts. Physical self-concept is further subdivided into self- perceptions of physical ability and self-perceptions of physical appearance.

Sonstroem and Morgan's model (1989) is vertically arranged in degrees of increasing situational generality from physical self-efficacy at the base of the figure to global self-esteem at the top of the hierarchy. Lower level elements are conceived as components of higher level elements, and changes in these lower level elements are postulated as being instrumental to changes in higher order self-conceptions. The model contains only self-components previously shown to be associated with exercise.

Self-efficacy theory has proposed two different

approaches for the assessment of expectancies. Bandura argues that expectancies are specific and do not generalize, preferring measures of specific efficacy expectations. Others endorse the role of generalized expectancies measured by locus of control scales (Kaplan, Atkins, & Reinsch, 1984). Research in exercise behavior has shown that very general scales are incapable of predicting behavior in particular situations, but narrow, specific scales are able to do so. The specific scales, however, are limited in portraying major life adjustment changes (Dishman, 1988).

One of the most frequently examined factors in the medical compliance literature has been motivation (Dishman, Ickes, & Morgan, 1980). Motivation has received the most extensive attention of any psychological variable studied (Baekeland & Lundwall, 1975). Self motivation as defined in the research related to exercise is a socially learned characteristic which is dependent upon self-reinforcement skills (Dishman, & Gettman, 1980). For example, those who are self motivated or have a generalized tendency to follow through with behavioral decisions are more likely to continue exercise programs in clinical, corporate, and community settings (Dishman, 1982; Dishman, 1984; Wankel, 1984; Ward & Morgan, 1984). Thirty-four of the forty-one studies conducted during the past 20 years which have included motivation as an independent variable have found it to be a significant factor influencing compliance (Altman, Brown, & Sletten, 1972; Caine, Wijesinghe, & Wood, 1973;

Heilbrun, 1973; Wieland & Novack, 1973). Its use as a prediction and screening measure for exercise adherence is strongly recommended (Dishman, 1988).

Several studies have demonstrated the importance of self-motivation in exercise adherence (Dishman, 1984; Dishman & Ickes, 1981; Dishman, & Steinhardt, 1988; Dubbert, Stetson, & Corrigan, 1991; Knapp, 1988; Raglin, Morgan, & Luchsinger, 1990). Self motivation when combined with biological traits such as body weight and composition can be an accurate predictor of supervised exercise behavior (Dishman & Ickes, 1981; Ward & Morgan, 1984). Self motivation does not, however, appear to reliably predict daily participation or whether the person will drop out of supervised settings (Dishman, 1984; Wankel, 1984; Ward & Morgan, 1984). Self-motivated persons also are less effected by activity barriers, such as inconvenience of the activity or time constraints (Dishman, 1982, 1984). Self-motivation may reflect the presence of self-regulatory skills such as effective goal setting, self-monitoring of progress, and self-reinforcement that have been found to be important for adherence to physical activity (Dishman, Sallis, & Orenstein, 1985; Martin, & Dubbert, 1982). Daily self-monitoring of activity was shown to produce better adherence to exercise than weekly self-monitoring (King, Taylor, Haskell, & DeBusk, 1988). There are currently few data available evaluating specific parameters of such skills and how best to utilize them to enhance exercise adherence.

A number of assessment strategies have been developed to identify behavioral tendencies to persevere. Dishman and Ickes (1981) developed the Self-Motivation Inventory (SMI) which utilizes a 40 item test pool with a Likert type scale to measure the tendency of individuals to engage in a behavior regardless of extrinsic reinforcement. They reported that subjects with high scores on the SMI were more likely to adhere to an exercise program. The SMI has been found consistently to correlate with physical activity in many of the populations in which it has been studied: Dishman and Steinhardt (1988), college students; Dubbert, Stetson, and Corrigan (1991), women; Knapp (1988), general adult population; and Raglin, Morgan, and Luchsinger (1990), female athletes.

Since the appearance of the monograph on internal versus external control of reinforcement (Rotter, 1966), a wide interest in this construct has appeared in the social sciences (Rotter, 1992). Not surprisingly, the construct of locus of control also appears in the adherence literature. Rotter's locus of control construct separated people into internal controllers, those who believe they can control the outcomes in their lives, and external controllers, those who believe their lives are controlled by chance or powerful others. Internal controllers as opposed to external controllers are predicted to maintain more positive behaviors in the areas of preventive and corrective medicine.

Weinberg, Hughes, Critelli, England, and Jackson (1984) found that internal locus of control predicted weight loss in a program emphasizing self-control techniques. Some studies have associated internality and smoking cessation (Wallston & Wallston, 1978). Using an interactional model, Wallston, Wallston, Kaplan, and Maides (1976) found that internals in a self-directed program and externals in a group program tended to lose more weight.

Exercise studies with adults have shown exercisers to have a more internal locus, whereas prospective studies have shown inconsistent relationships between locus of control and supervised adherence (Dishman, & Ickes, 1981; Dishman, & Steinhardt, 1990). Sonstroem and Walker (1973) found that college males with a tendency toward internal locus of control and with positive attitudes toward exercise were more fit and more physically active than the remainder of the college male population.

The Multidimensional Health Locus of Control (MHLC) Scale (Wallston et al., 1978) has been relatively unsuccessful in predicting health outcomes or in predicting exercise program adherence (Dishman & Gettman, 1980). This scale was specifically developed to measure locus of control in regards to health behaviors. Studies in which the MHLC Scale was used in conjunction with other variables (interaction model) have successfully predicted program participation, but not program adherence (Saltzer, 1982; Wallston, Wallston, Kaplan, & Maides, 1976).

Environmental Characteristics

Environmental factors have been found to exert both positive and negative influences on physical activity. Environmental factors include social support influences (spouse, family, co-worker, and medical professionals), and aspects of the physical environment itself (location and accessibility of exercise facility; perceived available time, and disruptions in routine).

Environmental Characteristics: Social Support. In supervised programs, support by a spouse has been found to exert consistent positive influence on adherence to physical exercise (Andrew, 1981; Dishman, 1982; Heinzelmann & Bagley, 1970; Oldridge, 1982). Spouse support in spontaneous programs has yielded weak or inconsistent results (Dishman, Sallis, & Orenstein, 1985). The data suggests that in programed activity where participants exercise according to time tables established by a specific program, spouse support is ranked as very influential in the exerciser's ability to exercise. In contrast, in a spontaneous exercise setting where the exerciser is free to exercise according to his/her own schedule, spouse support is not ranked as highly.

Further evidence indicates the importance of social support in the adoption and maintenance of physical activity. Social support can emanate from a variety of sources (program staff, family, friends, et cetera). Peer

influence in spontaneous programs appears to strengthen with age (King, Taylor, Haskell, & DeBusk, 1990; Sallis, Hovell, Hofstetter, & Elder, 1989). The family seems to influence and be influenced by the physical activity habits of its members (Loy, McPherson, & Kenyon, 1978). There does appear to be family aggregation of physical activity levels (Bouchard, & Malina, 1983; Perusse, Tremblay, Leblanc, & Bouchard, 1989), although the specific physical and behavioral pathways influencing this effect remain unclear. Perceived family problems have also been associated with poor adherence (Oldridge, Donner, Buck, & Jones, 1983).

Environmental Characteristics: Aspects of the Physical Environment. Perceived available time is the most common reason given for dropping out of programs (Dishman, 1982; Martin & Dubbert, 1982; Oldridge, 1982). However, regular exercisers are as likely, or more likely than the sedentary to view time as a barrier to activity (Dishman, Sallis, & Orenstein, 1985). Perceived available time in spontaneous programs has been demonstrated to be a weak or inconsistent factor in exercise (Dishman, Sallis, & Orenstein, 1985).

Perceived access to facilities and geographic proximity are consistent predictors of entry and continued participation in supervised settings (Andrew, 1981; Dishman, 1986; Oldridge, 1982; Teraslinna, 1969), particularly among the elderly (Shephard, 1987). Unexpected disruption (weather, change in work or home schedules, illness, et cetera) in the routine of the supervised activity has been

found to disrupt or prematurely terminate the activity (Dishman, 1986; Cldridge, 1982). Whether these factors are excuses or reasons for poor adherence is uncertain.

Summary: Known Correlates of Physical Activity

An array of personal and environmental variables have been consistently associated with physical activity. In terms of personal influences on exercise, certain demographic factors emerge as consistent predictors of exercise participation. As age increases, probability of exercise decreases. Men are more likely to participate in vigorous levels of exercise, but women and men approach the same level of participation in moderate and light forms of exercise. Level of education is positively associated with leisure-time physical activity. Individuals who smoke or are obese are less likely to exercise, and finally, blue-collar occupation predicts poor adherence in the exercise programs studied.

A variety of cognitive factors have been included in research involving personal correlates of exercise. Knowledge of and belief in the health benefits of physical activity predicts adoption of an exercise regimen, but fails to predict adherence. Those who believe their health as poor are unlikely to adopt or adhere to any physical activity. Intentions to be physically active have consistently failed to predict subsequent participation, and finally, subjective reports of increased well-being and

feelings of enjoyment as a result of exercise seem to be strong motives for continued participation.

Personality traits that consistently relate to exercise participation include self-esteem, self-motivation, and locus of control. Each of these predictors is, however, limited in its predictive capability. Increases in self-esteem as a result of exercise participation are well documented. However, the actual influence of self-esteem on exercise adoption or adherence is still unknown at this time. Self-motivation is a strong predictor of exercise adherence, but does not predict exercise drop-outs. And finally, locus of control studies with adults have shown exercisers to have a more internal locus, whereas prospective studies have shown inconsistent relationships between locus of control and adherence.

Regular participation in physical activity and exercise is best viewed as a dynamic process in which adoption and maintenance of involvement are key outcomes. There has been no research conducted to specify important interactions between known correlates. It appears that some variables are direct in their influence while others operate indirectly, through mediators. Some describe dynamic behavioral processes while others describe personal and environmental traits. As stated by Dishman, Sallis, and Orenstein (1985) there is a need for research that tests these correlates from theoretical models. These models can then be used to guide interventions in the adoption and

maintenance of physical exercise. The following section summarizes the research on these models.

Psychological Models and Exercise

The models reviewed here have either been tested directly in exercise programs or more often have been used to examine other health-related behaviors such as compliance to medical regimen, smoking cessation, or weight loss (Dishman, 1988). Models reviewed include the health belief model (Rosenstock 1974), and the theory of reasoned action (Fishbein, & Ajzen, 1975). Additionally, two models developed specifically for the prediction of exercise behavior are included, the psychological model for physical activity participation (Sonstroem, 1978), and the psychobiologic model (Dishman, & Gettman, 1980). Evaluation of the models is based on theoretical as well as limited research documentation.

Health Belief Model

The Health Belief Model (HBM) evolved from research conducted in the early 1950's by the U.S. Public Health Service in attempting to determine why people failed to utilize screening tests for the detection of asymptomatic disease (Rosentock, 1974).

Health behavior, defined by Kasl and Cobb (1966) as any activity undertaken by a person believing himself to be healthy, for the purpose of preventing disease or detecting

it in an asymptomatic stage, is distinguished from illness and sick-role behaviors. Data from interviews with 842 randomly selected adults (Harris, & Guten, 1979) indicate that virtually everyone performs some health protective behaviors, and that through cluster analysis these variables form the Health Belief Model. The formal model was developed by Rosenstock (1966) and Becker and Maiman (1975), and has been used to identify attributes of individuals (their health beliefs) or their settings (environmental cues to action) that can be modified to increase persons' contact or compliance with health professionals. As initially formulated by Rosenstock and his associates (1966, 1969, 1974), the model viewed preventive health action as likely to be performed by persons who (1) feel threatened by a disease; (2) perceive the benefits of preventive action to outweigh its cost; and (3) are exposed to some behavioral cues to action, all of the former being modified by (4) a set of demographic, structural, and social psychological factors.

There are four components to this Health Belief Model. Susceptibility, referring to an individual's perception of the likelihood of contracting a particular disease; severity, the consequences of developing this disease; benefits, which relates to an individual's beliefs regarding the effectiveness of taking a specific health action; and barriers, which are beliefs regarding the potentially negative aspects of adopting the particular health behavior.

These variables are influenced in turn by demographic and sociopsychological variables.

One review of 46 studies (Janz & Becker, 1984) reported outstanding success of the model on most of its four major dimensions. The reviewers reported predictive significance levels for susceptibility (81%), severity (65%), benefits (78%), and barriers (89%) in the cases studied.The use of the HBM in exercise settings has failed to replicate the results cited above (Lindsay-Reid, & Osborn, 1980; Olson, & Zanna, 1982). HBM variables may be ineffectual in anticipating later, ongoing compliant behaviors in healthy adults (Slenker et al., 1984). While the HBM has been used extensively in examining sick-role behaviors (behaviors which are a result of illness and are reinforced by that illness, resulting in a continued performance of the behaviors), this precludes a careful analysis of the numerous motivations for exercise, of which many do not involve illness avoidance as the HBM has been developed for (Olson & Zanna, 1982).

Theory of Reasoned Action

Fishbein and Ajzen (1975) developed a model that attempts to predict behavior from a person's intention to actually perform the specific behavior in question. According to their model shown below, behavioral intention (BI) is influenced by a person's attitude toward performing the behavior (Aact) and by the subjective norm (SN) regarded

as the perception of what important others believe (spouse, family, health professionals, and peers) about the subject's performing the specific behavior. The model is represented by a formula:

B ~ BI = w1 Aact + w2 SN, where

    B   = Behavior
    BI   = Behavior Intention
    w1, w2   = regression weights
    Aact = attitude towards performing the behavior
    SN   = subjective norm

The theory of reasoned action has been applied successfully to a variety of health-related behaviors such as undergraduate intention of drinking alcohol (Budd, & Spencer, 1984; Kilty, 1978), adolescent smoking intentions (Sherman et al., 1982), and weight loss behavior (Saltzer, 1982). Reviewers have found merit in this model's incorporation of interactionism (Sonstroem, 1988). By using narrow, situation-specific attitude and intention measures, interactions between personal correlates and the situation are promoted (Dishman, 1988). The Subjective Norm (SN) component of the formula has also received praise, as it measures social support emanating from spouse, family, health professionals, and peers. Research has demonstrated that these situational variables do predict physical activity participation (Dishman, Sallis, & Orenstein, 1985).

Although the Fishbein model is regarded as incomplete because of the questioned validity of predicting behavior by the simple additive model contained in the model's theory, it remains the preferred model for exploring these complex

interrelationships (Sonstroem, 1988). The behavioral
intention component has been demonstrated to be one of the
most important and one of the most consistently relevant
predictors of continued participation in health improvement
programs (Davis, Jackson, Kronenfeld, & Blair, 1984).
Presence of the subjective norm (SN) component provides a
mechanism for better interpreting the influence of social
support. However, no direct examination of long term
activity adherence has been made to date (Sonstroem, 1988).

Psychological Model for Physical Activity Participation

The psychological model for physical activity
participation (Sonstroem, 1978) was the first model
developed specifically for the prediction of exercise
involvement. As shown in Figure 1 the model also
demonstrates how exercise and consequent physical fitness
contribute to enhanced self-esteem. This model proposes
that enhanced self-esteem is the direct result of exercise.
More specifically, in predicting exercise participation the
model predicts that self-perceptions of physical ability
lead to an estimation of one's ability which subsequently
influences an individual's interest in physical activity
(attraction) and that attraction provides the greater
influence on future exercise participation. Sonstroem's
(1978) model was developed in conjunction with studies of
adolescent boys and contains Physical Estimation and
Attraction Scales (PEAS) (Sonstroem, 1974). The Estimation

scale contains 33 items assessing self- perceptions of physical activity, conceived as a component of global self-esteem. The 54 items of the Attraction scale measure interest in vigorous physical activity. The model has been uniformly successful in presenting correlational evidence associating physical activity and psychological health in adolescent males (Dishman, 1978; Morgan & Pollock, 1978; Neale, Sonstroem, & Metz, 1969; Sonstroem, 1974, 1976). Estimation scores have also related positively and significantly to lack of personality disorder, neuroticism, or maladjustment (Sonstroem, 1976).

While Sonstroem's model has been successful in associating exercise with psychological health in adolescent males, it has been less effective in predicting actual exercise behavior. The model highlights the relationship between exercise and psychological health but fails to predict just who will exercise. Using an adult form of the PEAS, Dishman cited three studies (Dishman, 1988; Morgan 1976; Morgan & Pollock, 1978) which failed to find a significant relationship between Attraction and exercise program adherence. Replication studies with adolescent males have also failed to significantly predict exercise adherence.

SELF-ESTEEM

↑

ESTIMATION―――――→ ATTRACTION

↑

PHYSICAL ABILITY

↑
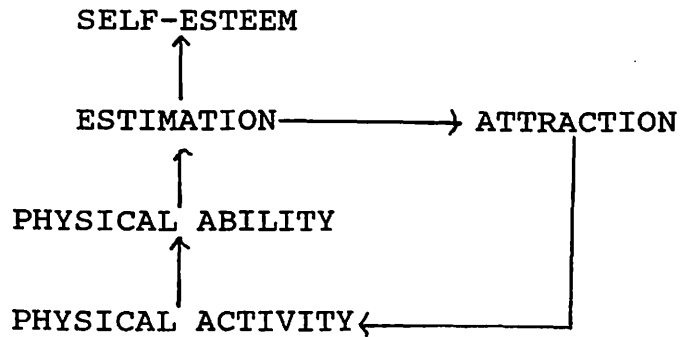
PHYSICAL ACTIVITY←――――――

Figure 1   The Psychological Model for Physical Activity Participation (Sonstroem, 1978).

Although the Attraction scale and attitude statements in general have been successful in predicting initial recruitment to exercise experiences, it is apparent that the model is ineffective in predicting exercise adherence. Being interested in or attracted to exercise and believing oneself capable of success at exercise provides insufficient motivation for adhering to exercise (Dishman, 1982). Additionally, the Attraction statements in particular have been criticized as bearing minimal relationship to vigorous exercise behavior carried on over time. The model has also been criticized for measuring attitude toward an object (exercise), instead of assessing an individual's attitude toward actually performing a specified behavior (Dishman, 1988). According to Dishman, the exercise adherence literature has tended to discount the ability of attitudes to predict activity maintenance. And finally, the model is greatly limited by the PEAS scales, which do not appear to be valid for adult populations.

Psychobiologic Model

Dishman and Gettman (1980) proposed a psychobiologic screening model with constructs relevant to percent body fat, body weight, and self-motivation as predictor variables. The model was developed in a 20-week prospective study with 21 male cardiac patients and 45 male healthy nonrisk subjects, and successfully predicted with 78.8% accuracy adherers and dropouts. In a follow-up study (Ward & Morgan, 1984) the model successfully predicted 88% of the adherers but failed to predict dropouts accurately, especially with the female sample. No significant F differences were obtained between adherers and dropouts in percent body fat, body weight, or self-motivation. Ward and Morgan (1984) concluded that the factors influencing adherence differ between the sexes and that different factors affect adherence over time.

Criticisms (Sonstroem, 1988) of this psychobiologic model (Dishman, & Gettman, 1980) center on the use of a small sample size, (n = 66) which hampers reliability or generalizability of predictions, and its inability to predict dropouts. This lack of prediction in the case of dropouts quite possibly arose from the small sample size combined with the relatively small number of dropouts (n = 23) in the original sample.

Replication results have been inconsistent, especially the predictive capability of body weight and percent fat. Dishman (1981) analyzed data of 362 adult male patients

referred to a University of Wisconsin exercise program over a 5-year period and found body weight and percent fat to be significantly associated with adherence. *Similar results were obtained by Massie and Shephard (1971).* However, both Morgan (1977) and Olson and Zanna (1982) found that body weight and percent fat failed to predict either exercise adoption or adherence. In a multi-factor model with many interactions between components, a variable whose bivariate relationship with the dependent variable is negative can possibly make a positive predictive contribution in conjunction with other variables (Sonstroem, 1988.) Whether or not this is true in the case of the psychobiologic model awaits further testing.

Dishman (1988) cites these problems, but is encouraged by the self-motivation variable within this model which has consistently been proven to be effective as a prediction and screening measure for exercise adherence.

Summary: Psychological Models and Exercise

Four psychological models related to exercise were reviewed and evaluated based on theoretical as well as research support. The Health Belief Model (HBM) was initially developed to explain the relationship between beliefs and the practice of healthy behaviors. As applied to exercise settings, the model has not predicted exercise adoption or adherence. The second model reviewed, the Theory of Reasoned Action, attempts to predict behavior from

a person's intention to actually perform the specific behavior in question. Research has demonstrated that this model does predict physical activity participation, but no direct examination of long term exercise adherence has been made to date.

The remaining two psychological models were developed specifically for the prediction of exercise behavior. The Psychological Model for Physical Activity Participation utilizes self-esteem as a predictor of exercise participation. The model highlights the relationship between exercise and psychological health but fails to predict just who will exercise. The final model reviewed, the Psychobiologic Model, is constructed around three predictor variables: percent body fat, body weight, and self-motivation. Replication results have been inconsistent, and the small sample size (n = 66) hampers reliability and generalizability.

Conclusions and Future Needs for Research

Developing an understanding of exercise participation and adherence poses an acute challenge for today's health researchers. An increasing amount of study over the past 10 years has failed to provide adequate answers to the questions about who will exercise, why, and for how long. This lack of understanding hinders development of interventions aimed at guiding interventions in public health. The final section of this paper forms conclusions

relative to the research on the correlates of exercise participation and offers recommendations for future research.

All of those variables related to personal characteristics of the exerciser have strong theoretical and empirical support for exercise participation. Gender (Sallis & Haskell 1986; Schoenborn, 1986), age (Gartside, Khoury, & Glueck, 1984; Schoenborn, 1986), education (Stephens, Jacobs & White, 1985; King et al., 1992), smoking status (Dishman, Sallis, & Orenstein, 1985), income (Schoenborn, 1986; Stephens, Jacobs, & White, 1985) and weight (Brownell, Stunkard, & Albaum, 1980; Council on Scientific Affairs, 1989; King & Tribble, 1991) have all been demonstrated to correlate with exercise. To date these personal variables have not been examined in a systematic fashion to explore exercise adherence.

While knowledge of correlates of physical activity habits has been a fruitful area for research for exercise adherence, more work remains to be done. More knowledge of these variables is needed to guide future interventions in public health. There has not been enough experimental research to support causation with known correlates. For example, motivation, self-esteem, and locus of control are three correlates related to exercise adherence. Whether these correlates are the result of exercise, or whether they influence the adoption and maintenance of exercise is unclear at this time.

There remains a need to conceptualize and in a general way rank these variables according to priority, and according to exercise setting. We know less about correlates in spontaneous settings as compared to supervised settings, and generalizations cannot be made from one setting to another. Studies are needed which focus on activity involving diverse populations, not restricted by age, gender, ethnicity, socioeconomic level, and health or fitness status. And finally, but perhaps most importantly, critical interactions of known correlates need to be studied, in order to capture the complexity of exercise behavior.

It is not possible to specify important interactions among known correlates at this time (King et al., 1992). It appears that some variables are direct in their influence while others operate indirectly through mediators. It is clear that a combination of personal and environmental characteristics influence the adoption and maintenance of physical activity. Further research needs to be conducted to determine the interaction and predictive power of each of these characteristics in relation to exercise adoption and adherence. Specifically, can groups of exercisers and non-exercisers be differentiated on the basis of personal and environmental characteristics?

Despite the importance of understanding the adherence process, there has been little systematic research in this area. In general, adherence studies have been limited by a

lack of standardization and by procedural shortcomings. There is no consistently defined definition of exercise adherence, for example, nor are there agreed upon operationalized definitions of frequency and intensity of exercise. The terms vigorous, moderate, and light exercise, and non-exercisers versus exercisers are all operationalized inconsistently in the research. Compounding these problems is a shift in emphasis from the study of vigorous leisure-time physical activity only, to the inclusion of the study of the health benefits of light and moderate activities. This shift in emphasis has made the task of describing and studying physical activity practices even more confusing.

Each study has specific limitations because of inadequacies in either measurement of correlates or of activity patterns, sample size, and representativeness, or because of inadequate control or quantification of possible confounding variables. All of these factors limit the ability of the studies to be generalized to other population groups. Also, most studies have been descriptive, relying on correlational data rather than experimental data.

Many of the psychological measures employed have been nonstandardized and administered ex post facto. Relying on nonstandardized measures that vary from study to study prohibits an examination of response comparability, reliability, or validity. Longitudinal studies have not been conducted to assess changes in mental health

functioning over time. We know, for example, that motivation and adherence are positively correlated, but we do not know if increased motivation is a function of exercise, or if motivation causes an increase in exercise. Another means of conceptualizing correlates of exercise has been to group specific correlates together in a conceptual framework, or model. These models have then been used to try and predict exercise participation. The empirical results of these efforts, however, have provided little guidance in recommending superior models for the study of exercise participation. Each of the models outlined in this paper failed to adequately predict the adoption of, or the adherence to, physical exercise.

There are, however, important findings which can be used to guide development of future models. One, the importance of studying exercise adherence from an interactional, multi-factor viewpoint rather than a single factor approach enables researchers to better capture the complexity involved in human exercise behavior. Two, it has been established that different factors affect adherence over time. Evaluating a variable only once, usually at the outset of program participation, fails to consider how these variables will interact with other variables during a process of change.

Process approach models which critically evaluate known exercise correlates over time are needed. Theoretical models will enable researchers to identify variables that

consistently predict the adoption and maintenance of exercise, thereby developing a unified approach among investigators and provide heuristic guidance in the development of more complete theories.

CHAPTER III

METHODS

The purpose of this study was three-fold: 1) to differentiate between exercisers and nonexercisers on the basis of personal characteristics; 2) to determine which environmental factors influence an individual's ability to exercise regularly; and 3) to determine whether adherence to exercise can be predicted by motivation, self-esteem, and/or locus of control. Chapter Three describes the methods and procedures of the study. Specifically, the chapter has been divided into five sections: statement of the research questions, description of the participants, description of the research instruments, description of the research strategy, and a description of the procedures.

Research Questions

For the purpose of this study, the research questions are the following.

1. Can exercisers and non-exercisers be differentiated on the basis of personal characteristics?

2. Which environmental characteristics relate to an individual's ability to exercise?

3. Can adherence to exercise be predicted by motivation, self-esteem, and/or locus of control?

Description of the Participants

Voluntary Nature of the Study

The 265 participants in this study were students from a community junior college in the southwest section of the United States. The participants were recruited student volunteers who were enrolled in General Psychology, Developmental Psychology, Human Relations, Sociology, Political Science, and History courses during the 1993 Spring semester. Permission to conduct this study was obtained from the Oklahoma State University Institutional Review Board (IRB), found in Appendix A. A copy of the voluntary participation statement form is included in Appendix B.

Representativeness of the Sample

Participants ranged in age from 18 to 54, with a mean age of 24. Sixty two percent (61.6%) of the participants were between 18 to 21 years of age, 31.5% of the participants were between 22 and 39 years of age, and 5.8% percent of the participants were between the ages of 40 and 54. Males comprised 37% (n=97) and females comprised 62% (n=165) of the sample. Seventy seven percent (76.7%; n=203) of the participants reported their marital status as single, and 22.3% reported their status as married (n=59). Three participants (1.1%) failed to indicate either age, gender, or marital status. In terms of education, 66% (n=175) of the sample had completed less than 30 hours of college

education; 24.9% (66) had completed 31 to 60 hours; 3.4% (n=9) had completed 61 to 90 hours; 1.9% (n=5) had completed 91 to 140 hours; .8% (n=2) had completed a Bachelor degree; .8% (n=2) had completed a Master degree; and .4% (n=1) had completed a Doctorate degree. Five participants failed to report their education. In conclusion, the sample for this study did adequately represent the population.

Number of Participants per Analysis

Overall 265 participants were used in the research study. However, due to missing items, or the nature of each research question, the number of cases used in each analysis varies.

Research Question One. Research question number one, "Can exercisers and non-exercisers be differentiated on the basis of personal characteristics?", utilized 164 of the original 265 participants. One hundred and one participants had at least one missing discriminating variable and were therefore excluded from the discriminant analysis.

Research Question Two. Research question number two, "How do environmental characteristics relate to regular exercise?" utilized only responses from those participants who self-reported as regular exercisers (people who exercise at a minimum of three times per week). Total number of participants utilized in the analysis for this question was 172.

<u>Research Question Three.</u> Research question number
three asks the question "Can adherence to exercise be
predicted by motivation, self-esteem, and/or locus of
control?" Of the 265 original participants, 9 were excluded
from the discriminant analysis due to missing scores on
either the motivation, self-esteem, and/or locus of control
scales. Number of participants for this analysis was 256.

Instruments

<u>Self Motivation Inventory</u>

In order to measure motivation related to exercise, the
<u>Self-Motivation Inventory (SMI)</u> (Dishman, Ickes, & Morgan,
1980) was used. Preliminary testing has demonstrated that
self-motivation as measured by the SMI is significantly
correlated ($r= .23$, $p<.001$) with self-report of exercise
frequency (Dishman, 1980). This instrument was normed on
401 undergraduates enrolled in introductory psychology
classes at a midwestern university, a population similar to
this study. The sample included both males and females who
ranged in age from 17 to 27 years of age with a mean age of
19.1 and a standard deviation of 1.46.

The <u>SMI</u> consists of 40 items concerned with an
individual's tendency to persevere or to be self-motivated.
Items are written in concise, simple sentences and are
phrased in the first person with an active voice. Examples
of typical items are: "I can persevere at stressful tasks,
even when they are physically tiring or painful," and "I

have a lot of will power."

The items are administered in a five point Likert format ranging from one ("very unlike me") to five ("very much like me"). Higher scores indicate higher levels of motivation. The resulting scale consists of 19 positively keyed and 21 negatively keyed items with a possible response range of 40-200. The pre-test sample demonstrated an actual range of 84-184 (mean = 140.5, SD = 19.4).

Internal Reliability. Item analysis (Dishman, Ickes, & Morgan, 1980) of the 40 test items revealed an alpha (Cronbach, 1951) reliability coefficient of .91. The age range for this sample was 17 to 27 years; mean = 19.1, SD = 1.46 years. Cross validation of the inventory on a second, independent sample of 48 undergraduates yielded an index of internal consistency r = .86.

Test-retest Reliability. Test-retest reliability on this second sample of 48 undergraduates yielded a test-retest reliability of .92 (df =46, p<.001, one-month time interval). A test-retest correlation of .86 (df=.38; p<.01) over a 20-week test period provides further evidence of reliability (Dishman, Ickes, & Morgan, 1980).

Construct Validity. Convergent evidence for construct validity is demonstrated by the SMI's relationship with the Thomas-Zander Ego-Strength Scale (r = .63, df = 62, p<.005) (Thomas & Zander, 1973). The relationship with ego-strength was expected and reinforces the conceptual nature of self-

motivation.

Discriminant evidence was provided for construct validity through self-motivation's pattern of association with other conceptually relevant psychometric variables. For example, correlations between self-motivation and social desirability, the desire to behave in a socially desirable manner, (Crowne & Marlowe, 1964), and achievement motive (Mehrabian, 1968), provide discriminant evidence for the validity of this construct. Although some shared variance between self-motivation and these constructs would be anticipated due to their motivational components, the obtained coefficients suggest that self-motivation does indeed represent a distinct motivational construct (Dishman, Ickes, & Morgan, 1980). Pearson product-moment coefficients indicated that self-motivation was only slightly correlated with an achievement motive ($r=.24$; $df=28$, $p>.05$), social desirability ($R=.26$; $df=28$; $p>.05$), and health locus of control ($r= -.23$; $df=64$; $p>.05$).

Predictive Validity. Predictive validity was demonstrated in a variety of naturalistic settings in which perseverant behavior was easily quantified (Dishman & Ickes, 1981). These settings included an exercise program for 64 undergraduate women in a voluntary, 8-month athletic training program for team rowing; a sample of 66 adult males involved in programs for preventive medicine and adult fitness designed to enhance either cardiovascular or muscular endurance; and a sample of 48 undergraduate males

involved in a cardiovascular endurance and muscular strength conditioning class at North Texas State University.

Internal-External Locus of Control Scale

The Internal-External Locus of Control Scale (I-E Scale) (Rotter, 1961) was developed to measure the degree to which an individual feels that reinforcement is or is not contingent upon his or her own action. The I-E Scale evolved through a number of forms. The first instrument developed by Phares (1957) was composed of 26 items, with 13 stated as external attitudes and 13 as internal. In its final form (Rotter, 1961) the I-E Scale is composed of 23 real and 6 filler items, designed to disguise the intent of the instrument.

Self-report instructions for the I-E Scale are printed at the top of the questionnaire and geared to an upper high school reading level, an appropriate level for a college population. The 29 items are usually completed in 15 to 20 minutes. The respondent selects which of two statements is more strongly believed. Scoring is accomplished by totaling the number of "external" responses (maximum score = 23); a higher score is indicative of increasing levels of externality. In terms of interpretation, the higher the score, the more reinforcement is seen to be the product of luck, chance, or the control of others, and the lower the score, the more likely is one to attribute reinforcement to the self.

One monograph appendix (Rotter, 1966) provides a

frequency distribution for male and female samples of university psychology students. For the 575 males the mean I-E score was 8.15 (SD = 3.88) with a range of 20 to 0. For the 605 females the mean I-E score was 8.42 (SD = 4.06) with a range of 21 to 0.

Internal Reliability. Item analysis and factor analysis show reasonably high internal consistency for an additive scale, ranging from .65 to .79 (Rotter, 1966). Samples included Ohio State University elementary psychology students, a national stratified sample from a Purdue opinion poll, and 10th, 11th, and 12th graders from a unidentified high school. Rotter reports that split-half or matched-half reliability tends to underestimate the internal consistency because the test is an additive one and items are not comparable. Kuder-Richardson reliabilities are also somewhat limited (Rotter, 1966) since the I-E Scale is a forced-choice scale in which attempt is made to balance alternatives so that probabilities of endorsement of either alternative do not include the most extreme splits.

Test-retest Reliability. Rotter (1966) reports that test-retest reliability is satisfactory with other methods of assessing the same variable such as questionnaire, interview assessments, Likert scale and ratings from a story-completion technique. Test-retest reliability coefficients (Rotter, 1966) range from .49 to .83, depending upon the time interval and the sample. Reliability coefficients as reported by Kiehlbauch (1967) are .75 for a

three month period, .39 for a six month, and .26 for a nine month period.

Discriminant Validity. Discriminant validity is demonstrated by the low relationship with measures of intelligence, social desirability, and other behavioral measures (Rotter, 1966). Rotter reported correlation coefficients ranging from -.07 and -.35 between the I-E Scale and the Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1964) using college student samples. A correlation of -.22 represents the median for the different samples of college students where males and females were combined. Correlation coefficients between the I-E Scale and intelligence measures were also reported (Rotter, 1966). Correlation coefficients range from -.22 to .03 with college students. Ware (1964) found a correlation of .24 between the I-E Scale and the Taylor Manifest Anxiety Scale. Rotter and Rafferty (1950) compared the I-E Scale to the Rotter Incomplete Sentences Blank and found no significant linear relationship between the two instruments.

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is recommended as a content-free scale assessing general self-worth (Sonstroem & Morgan, 1989). Wylie (1974) rates the SEI as one of the best instruments evaluating overall self-regard. Items such as "I feel I do not have much to be proud of" refer to the self, free of context and specific

ability. It is important in exercise research to discriminate between a global measure of self-esteem, and a more domain-specific measure of physical attractiveness or physical estimation. The SEI provides this important discriminant function, not confounding a person's overall estimation of self-regard with his/her estimation of physical ability.

While the SEI originally employed a Guttman scoring format, more recent scoring has utilized simple summation across the Likert scales (Crandall, 1973). Using this method, a higher score is indicative of higher levels of self-esteem.

The SEI was originally normed (Rosenberg, 1965) on students from ten high schools in New York. The sample consisted of 5024 high school juniors and seniors, approximating the population utilized in this study.

Reliability. A study by Silber and Tippett (Rosenberg, 1989) showed a test-retest reliability of .85, utilizing the simple summation scoring procedure.

Validity. The validity of the inventory was established by comparing correlational data of the SEI to other theoretically meaningful data. Percentage differences are reported by Sonstroem and Morgan (1989) comparing the SEI to levels of depression, anxiety, psychophysiological indicators, and peer-group ratings. While Sonstroem and Morgan report that each of these criterion groups correlated with their scale, it is impossible to verify this conclusion

as their report lacked specific data concerning correlation coefficients.

Research Strategy

The primary problem statements addressed in the treatment of the data are: (1) can groups of exercisers and non-exercisers be differentiated on the basis of personal characteristics; (2) which environmental characteristics relate to exercise; and (3) can adherence to exercise be predicted by motivation, self-esteem, and/ or locus of control? Consequently, both descriptive, inferential, and discriminant analysis techniques were utilized in answering the specific research questions.

Procedures

Permission to solicit subjects from undergraduate classes in liberal arts were obtained from the Institutional Review Board and the class instructors. Subjects were required to sign an informed consent form before data collection began (see Appendix C). Participation or failure to participate in this study did not affect a student's course grade in any way. Students who chose not to participate were allowed to leave the classroom or work quietly at their desks. Subjects were told that they could obtain a summary of the results of the study. Confidentiality on all measures was protected.

Administration of the study was conducted by the researcher herself. All subjects were given a packet containing a demographic questionnaire (see Appendix D), the

Self-Motivation Inventory (Dishman, 1980), the Rosenberg Self-Esteem Scale (1965), and Rotter's Locus of Control Scale (1966). See Appendixes E, F, and G for these psychological instruments. The demographic questionnaire asked subjects for the following information: age, sex, income, weight, education, use of nicotine products, and intensity and frequency of exercise. In order to protect against carry-over effects the motivation, self-esteem, and locus of control instruments were partially counterbalanced. The tests were alternated into three different packets and randomly distributed to participants.

After the packets were distributed, the investigator instructed the participants to read the directions on each instrument and to answer each item as honestly and completely as possible. Participants were allowed as much time as they needed (40 minutes was the average) to complete the required information and return the packets.

Research Design

Research question one, "can exercisers and non-exercisers be differentiated on the basis of personal characteristics?" utilized a discriminant analysis technique to determine the relative importance of each variable to group differentiation. Discriminant analysis was calculated using ten personal characteristics: age, sex, marital status, income, education, smoking habit, body mass index, and scores on measures of motivation, self-esteem, and locus of control. These ten personal characteristics were used in the analysis to

determine if these factors would yield a linear composite that would discriminate between exercisers and nonexercisers. Frequency analysis was used to examine research question number two, "which environmental factors did exercisers report as influential to their exercise program?". Regular exercisers ranked as either very important, somewhat important, or not important a variety of environmental factors known to influence one's likelihood to exercise. These environmental factors were then rank- ordered from very important to not important.

The third research question used discriminant analysis to address the question, "can adherence to exercise be predicted by motivation, locus of control, and/or self- esteem?". Those participants who self-reported as having maintained an exercise program for at least six months were identified as exercise adherers. Participants who exercised, but for less than six months were identified as non-adherers. Total scores were derived for each participant on the measures of motivation, locus of control, and/or self-esteem. These total scores were then used in the discriminant analysis to determine if these scores would yield a linear composite that would discriminate between adherers and nonadherers.

Before the analysis, reliability analyses were conducted for the I-E Scale, SMI, and the Self-Esteem Scale. Coefficient Alpha was obtained to estimate internal consistency reliability of each instrument.

CHAPTER IV

RESULTS

The purpose of this chapter is to present the results
of the statistical analysis on each of the three research
questions identified previously in this study. The
questions related to this study are: one, to determine if
exercisers versus non-exercisers could be differentiated on
the basis of personal characteristics; two, how do
environmental factors relate to exercise; and three, to
determine whether adherence to exercise could be predicted
by motivation, locus of control, and/or self-esteem.
Exercisers were defined as individuals who exercised at
least three times per week and non-exercisers were defined
as those individuals who either reported no exercise or
reported exercising less than three times a week. Exercise
adherence was defined as exercise which had been maintained
at least six months.

Reliability Analysis

Prior to the analysis of each research question,
reliability analyses were conducted for Rotter's (1961) I-E
Scale, Dishman's (1980) SMI, and Rosenberg's (1965) Self-
Esteem Scale. Coefficient Alpha was obtained to estimate
internal consistency reliability of each instrument. The

reliability coefficient for the I-E Scale in this study was
.72 which is comparable to the reliability coefficient
reported by Rotter (1966). The reliability coefficient for
the SMI was .92 which was slightly higher than the .91
reported by Dishman, Ickes, and Morgan (1980). The
reliability coefficient for the Self-Esteem Scale was .86,
slightly higher than the .85 reported by Rosenberg, 1989).

Research Question One

The first research question, "can exercisers and non-
exercisers be differentiated on the basis of personal
characteristics?, attempted to classify subjects into groups
on the basis of a battery of measurements; as such,
discriminant analysis was appropriate for the analysis of
this question (Stevens, 1992). The battery of measurements
for this particular study was represented by ten personal
characteristics or variables: age, sex, marital status,
education, income, smoking habit, body mass index,
motivation, self-esteem, and locus of control. Table II
shows the group means for these variables.

Discriminant analysis was used to attempt to classify
exercisers and non-exercisers (dependent variables) along a
line of these ten personal characteristics (independent
variables). Two-hundred and sixty five subjects were
originally used in this analysis. One hundred and one cases
had at least one missing discriminating variable, leaving a
total of 164 cases for the discriminant analysis.

Examination of the canonical discriminant function

coefficients revealed significance. The discriminant function extracted was found to significantly discriminate between exercisers and non-exercisers. Given the two groups, the single function, Wilkes lambda of .868 (approximate Chi square = 22.280, df = 10, p < .05) was significant. This function does appear to correctly classify exercisers versus non-exercisers. Refer to Table II for significance of differences between non-exercisers and exercisers.

In order to interpret the nature of the function extracted, the comparisons were examined revealing that three of the factors were significant in this linear composite. The first variable, income, accounted for 89% of the variance in this function. The second variable, marital status accounted for 55% of the variance, and the third variable education, accounted for 44% of the variance. See Table III for the percentage of variance contributed to the function by each of the ten variables.

The classification of exercisers and non-exercisers with the discriminant function was correct in 63.41% of the cases as presented in Table IV. In conclusion, the linear composite extracted from the ten personal characteristics was significant. Therefore, the null hypothesis was rejected.

Research Question Two

Which environmental factors did exercisers report as influential to their exercise program? Of the original 265

subjects, 172 identified themselves as regular exercisers (exercised at least three times per week). These 172 subjects who identified themselves as regular exercisers identified 13 factors as either very important (coded 1) somewhat important (coded 2), or not important (coded 3) to their ability to exercise regularly (see Table V). The environmental factors consisted of the following items: exercise facility open convenient hours; exercise location is convenient to my home; availability of time to exercise; having a spouse who is supportive of my exercise; exercise as a time to be by myself; having friends to exercise with; having friends who are supportive of my exercise; having a spouse to exercise with; exercise location convenient to work; having co-workers to exercise with; having co-workers who are supportive of my exercise; having a supervised exercise setting; and "other". The "other" designation was utilized infrequently by respondents, for idiosyncratic responses such as "my doctor tells me to exercise", or "a time to walk my dog".

Frequency analysis was used to determine the percentage of responses to each of these 13 factors. These environmental factors were then rank-ordered from very important to not important. Table V illustrates the rank ordering of these environmental factors. The number of responses to each factor varies, as subjects failed to respond to some items.

Having an exercise facility which is open convenient hours (32.8% = very important) and located close to home

(30.2% = very important) are reported as the strongest factors in influencing a person's ability to exercise regularly. While the location and hours of operation of the exercise facility appear to be of critical importance, it is not necessary for the facility to offer supervision. Preference for a supervised exercise setting was ranked last (3.8%). Ranked third was "availability of time to exercise" (27.2%).

Various social support systems do seem to influence respondent's ability to exercise regularly. "Having a spouse who is supportive of my exercise" was ranked fourth (22.6%) followed by "exercise is a time to be by myself" (21.1%). "Having friends to exercise with" (21.1%) was slightly more important than "having friends who are supportive of my exercise" (18.5%). "Having a spouse to exercise with" (15.5%) was ranked lowest of the social support factors.

Those factors ranked as least important were "exercise location is convenient to my work" (8.7%); "having co-workers to exercise with" (6.8%); "having co-workers who are supportive of my exercise" (6.4%); and as mentioned above, "I prefer a supervised exercise setting" was ranked last (3.8%).

Research Question Three

Can adherence to exercise be predicted by motivation, locus of control, and/or self-esteem? This question attempted to classify subjects into groups (adherers vs.

non-adherers) based upon a battery of measurements. Therefore, discriminant analysis was utilized for the analysis of this question (Stevens, 1992). Two-hundred and sixty five original subjects were used. Nine of these were excluded from the analysis: eight had missing or out-of range group codes and one had at least one missing discriminating variable, leaving a total of 256 for the discriminant analysis.

The battery of measurements for this particular question consisted of a motivation questionnaire, a locus of control scale, and a self-esteem questionnaire. Table VI shows the group means for these measures. Examination of the canonical discriminant function coefficients revealed non-significance. The discriminant function extracted did not discriminate between adherers and non-adherers. Given the two groups, the single function, Wilkes lambda of .999 (approximate Chi square = .092, df = 3, p > .05) was non-significant. Refer to Table VI for significance of differences between adherers and non-adherers.

Measurements of motivation, locus of control, and self-esteem do not appear to correctly classify adherers vs. non-adherers. The classification of adherers and non-adherers with the discriminant function was correct in 51.95% of the cases as presented in Table VII. In conclusion, the linear composite extracted from the three personality measurements of motivation, locus on control, and self-esteem was non-significant. Therefore, the null hypothesis was not rejected.

Summary of Results

Three research questions related to exercise behavior were examined. Question one stated "can exercisers and nonexercisers be differentiated on the basis of personal characteristics?" These ten personal characteristics included age, sex, marital status, education, income, smoking habit, body mass index, motivation, self-esteem, and locus of control. Exercisers were defined as individuals who exercised at least three times per week; nonexercisers were defined as subjects who self-reported no current exercise regimen. The discriminant function extracted was found to significantly discriminate between exercisers and non-exercisers. The ten personal characteristics did discriminate between the two groups. Two factors, income and education contributed the most variance in the overall equation.

Research question two examined specific environmental factors that influenced an exerciser's exercise program. Regular exercisers identified 13 factors as either very important, somewhat important, or not important. Frequency analysis resulted in a ranking of these environmental factors. Convenience in terms of the exercise setting being open and available and located close to home rated at the top. Least influential was a supervised exercise setting; exercisers don't appear to need or want supervision of their exercise. Table V lists each of the 13 environmental factors by rank order. Research question three examined

whether adherence to exercise could be predicted by motivation, locus of control, and/or self-esteem. Discriminant analysis failed to find significant differences between exercisers and nonexercisers on these three measures. Measurements of motivation, locus of control, and self-esteem do not appear to correctly classify adherers verus nonadherers.

Thus it does appear that groups of exercisers and nonexercisers can be discriminated between on the basis of personal characteristics, which include demographic characteristics and personality measures of locus of control, motivation, and self-esteem. However, these same personality measures by themselves did not discriminate between these same groups. It appears that locus of control, motivation, and self-esteem alone do not predict exercise. And finally, there is some evidence to suggest that certain environmental factors influence the likelihood of exercise better than others.

TABLE II

PERSONAL CHARACTERISTICS: GROUP MEANS AND STANDARD
DEVIATIONS AND SIGNIFICANCE OF DIFFERENCES BETWEEN
NON-EXERCISERS AND EXERCISERS

Variable	Non-Exerciser Mean	SD	Exerciser Mean	SD	F	p
Age	21.75	5.60	24.03	8.12	3.34	ns
Sex (1=M 2=F)	1.63	.49	1.59	.49	.30	ns
Marital (1=married; 2=single)	1.80	.40	1.82	.38	.44	ns
Income	6975	5216	14022	14789	11.13	.01
Education *(1= 0-30 hrs; 2= 31-60 hrs)	1.19	.40	1.60	1.04	7.69	.01
Smoke (1= no; 2-8= am't smoked)	2.15	1.80	1.97	1.56	.43	ns
Body Mass Index (X < 25 = non-obesity)	22.64	4.73	23.87	5.29	2.06	ns
Motivation	143.92	21.00	151.22	23.54	3.65	ns
Self-esteem	31.63	4.50	33.01	4.85	2.98	ns
Locus of Control	10.90	3.95	10.15	3.99	1.27	ns

* 3 = 61-90; 4 = 91-140; B.A. = 5; B.A.+ = 6; Master's = 7;
  Master's + = 8; Doctorate = 9.

TABLE III

PERSONAL CHARACTERISTICS: PERCENTAGE OF VARIANCE
CONTRIBUTING TO THE FUNCTION

Discriminating Variables	Discriminant Function
Age	-.198
Sex	.002
Marital	.550
Income	.892
Education	.437
Body Mass Index	.208
Smoke	-.146
Motivation	.112
Self-Esteem	.201
Locus of Control	-.067

TABLE IV

PERSONAL CHARACTERISTICS: CLASSIFICATION OF EXERCISERS
VS. NON-EXERCISERS WITH DISCRIMINANT FUNCTION

Actual Group		No. of Cases	Predicted Group Membership 1	2
Group Exerciser	1	112	68 60.7%	44 39.3%
Group NonExerciser	2	52	16 30.8%	36 69.2%

TABLE V

* ENVIRONMENTAL CHARACTERISTICS: PERCENTAGE RANKING FROM
VERY IMPORTANT TO NOT IMPORTANT

Environmental Factor	Very Important	Somewhat Important	Not Important
Exercise facility open convenient hours	32.8 %	15.1 %	12.8 %
Exercise location is convenient to my home	30.2	20.0	13.2
Availability of time to exercise	27.2	18.9	7.5
Having a spouse who is supportive of my exercise	22.6	18.1	18.5
Exercise is a time to be by myself	21.1	20.4	18.5
Having friends to exercise with	21.1	19.6	21.5
Having friends who are supportive of my exercise	18.5	20.0	23.0
Having a spouse to exercise with	15.5	18.9	24.9
Exercise location is convenient to my work	8.7	13.2	37.7
Other:_____	7.9	3.0	2.3
Having co-workers to exercise with	6.8	7.9	44.9
Having co-workers who are supportive of my exercise	6.4	8.7	44.5
I prefer a supervised exercise setting	3.8	13.2	38.9

*Percentages do not total 100% due to missing values.

TABLE VI

MOTIVATION AND LOCUS OF CONTROL AND SELF-ESTEEM:
GROUP MEANS AND STANDARD DEVIATIONS AND
SIGNIFICANCE OF DIFFERENCES BETWEEN
ADHERERS AND NON-ADHERERS

Variable	Non-Adherers Mean	SD	Adherers Mean	SD	F	p
Motivation	146.87	21.95	147.61	22.79	.500	ns
Locus of Control	10.44	4.18	10.28	3.96	.743	ns
Self-Esteem	32.02	·5.46	32.08	4.85	.800	ns

TABLE VII

MOTIVATION AND LOCUS OF CONTROL AND SELF-ESTEEM:
CLASSIFICATION OF ADHERERS VS. NON-ADHERERS
WITH DISCRIMINANT FUNCTION

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1 Six months or more	195	103 52.8%	92 47.2%
Group 2 Less than six months	61	31· 50.8%	30 49.2%
Ungrouped Cases	8	4 50.0%	4 50.0%

CHAPTER V

SUMMARY, CONCLUSIONS AND LIMITATIONS

This chapter presents an overall perspective of the study and an interpretation of the results. Conclusions are drawn and discussed from these results and recommendations for future research are provided. Lastly, problems and limitations of the study are discussed.

Summary

The purpose of this study was to determine whether exercisers versus non-exercisers and adherers versus non-adherers could be differentiated on the basis of demographic factors, personality characteristics and/or environmental variables. Three types of exercisers were studied: regular exercisers who self-reported as exercising at least three times per week; adherers who reported sustained exercise for at least six months; and non-exercisers who exercised less than three times per week or not at all.

The study examined three research problems. One, could exercisers versus non-exercisers be differentiated on the basis of personal characteristics? Personal characteristics included age, sex, income, height, weight, and measures of motivation, locus of control, and self-esteem. The second problem statement examined how environmental characteristics

related to exercise. Environmental factors referred to relative importance/non-importance of items such as availability of time, convenience of exercise location, social support etc. The third question focused on subjects who self-reported as adherers, to determine whether they could be differentiated from non-adherers on the basis of motivation, locus of control, and self-esteem.

Discussion, Conclusions, and Implications

Research Question One

Analysis of the data relative to the first research question, can exercisers and non-exercisers be differentiated on the basis of personal characteristics, revealed that a discriminant function extracted from the demographic information and measures of personality significantly differentiated between exercisers and nonexercisers. The correct classification rate of exercisers versus non-exercisers was 63.4%. Therefore the null hypothesis was rejected, as the differences found between the two groups were too large to be attributed to chance.

Three variables appeared to account for most of the variance in the discriminant function. Income accounted for most of this variance, followed by marital status and education. It appears then that an individual's income level for the population studied was the best single demographic predictor of whether that person would exercise

at least three times per week. Caution must be used here, as income as self-reported by college students might not be accurately measured. When subjects reported their incomes, for example as $4000 annually, one can deduce that they are probably benefiting from parental income support, or other source of income. The $4000 reported figure then may not accurately describe their income status.Marital status accounted for the second highest amount of variance in the equation, followed by education. Apparently, being single with accumulated hours of college education predicts increased likelihood of regular exercise.

Two of the three demographic variables which successfully predicted regular exercise in this study (income, education, and marital status) have a basis of support in the research literature. Lower levels of income (blue collar workers) have been associated with lower levels of leisure-time physical activity than white collar employees. This study then adds additional support to the relative importance of income as a predictor in leisure-related exercise. What is not known at this time is just exactly how income influences exercise behavior. Individuals with higher incomes may have more free time available to participate in leisure-related activity. Blue- collar workers may perform vigorous levels of physical activity while at work, and therefore not need or see the benefit of additional exercise.

As in this study, education has also been found to consistently predict exercise participation. Well-educated

persons are more likely to participate in leisure-related exercise, but less likely to participate in work-related physical activity. Again, the exact nature of the influence of education on exercise is not understood at this time. The third variable, marital status, has not been a variable associated with exercise, and its appearance in this study as a predictor variable is surprising. What must be kept in mind is that the population utilized in this study was comprised of students who enroll in classes part-time and work full-time. It might be hypothesized that single students have more leisure time available to them than married students, many who have families, and therefore their free time is even further restricted.

Factors which do not appear to relate as well to regular exercise include the following: age, sex, body mass index, smoking, motivation, self-esteem, and locus of control. Again, caution must be utilized in interpreting these results. These variables in non-college aged populations have been found to predict exercise. In the sample utilized here, age range is restricted, as is body mass index, a measure of obesity. Obesity is not common to young adults, rather occurring more frequently in middle and later adulthood. Therefore, the relationship between age and weight to exercise must be used with caution when generalizing to non-college populations.

The lack of support in this study for the personality variables of motivation, locus of control, and self-esteem in predicting group differences as effectively as

demographic variables was surprising. Exercise related research has consistently found that participation in exercise programs has been associated with improved self-esteem, motivation, and internal locus of control scores. Apparently, differences between exercisers and nonexercisers in the present study are due more to income, marital status, and level of education than personal attributes of motivation, locus of control and self-esteem. It is important to note here that the overall means on each of these personality measures derived from the present sample did not differ significantly from the means published with each instrument utilized. In other words, subjects in this present study had similar levels of motivation, self-esteem, and locus of control when compared to normative data for each of the instruments utilized.

There are possible explanations for the lack of predictive power in the psychological measures used in this research. Studies utilizing self-esteem, motivation, and locus of control measures have traditionally used vigorous exercisers as their populations. In this study, light, moderate, and vigorous levels of exercise were all purposely used, based on more recent research indicating that there are physiological and psychological benefits from lighter forms of exercise. Preliminary results support speculation that less intense forms of exercise require less motivation, self-esteem, and locus of control when compared to more intense levels of exercise. More research is needed to verify this hypothesis.

Another possible explanation for the predictive failure of self-esteem, motivation, and locus of control is the differences in population used in this study. These instruments have predicted exercise participation in college-aged populations. The present study, however, relied on a commuter college population where most students work full-time and attend school part-time. Participants in this study were also older than traditional freshmen and sophomore students used most frequently in university research. Students in this study might have less leisure time available than their traditional aged university counterparts, and therefore their levels of self-esteem, motivation, and locus of control while "average" do not influence their ability to exercise. They simply don't have the time.

A possible preliminary conclusion is that increasing one's likelihood of exercising regularly depends less on manipulation of one's personality and more on manipulating one's demographic characteristics. Further research needs to be conducted to examine the particular ways income, marital status, and education impact our ability to exercise.

Research Question Two

Research question two, which environmental factors are influential to an exercise program, utilized frequency analysis to determine the percentage of responses to each of the 13 environmental factors used in the study. By

examining these results one can determine which of these
factors most facilitate an environment in which regular
exercise is most likely to occur. Knowing which factors
influence our ability to exercise regularly allows
individuals to control or manipulate their environment in
such a way that increases the likelihood of consistent
exercise. As has been previously noted in Chapter II,
benefits of exercise occur with regular, frequent exercise.
Infrequent, sporadic exercise does not appear to improve our
physiological or psychological well-being.

What factors then influence our ability to exercise
regularly? All of the factors in this study that were found
to influence one's ability to exercise regularly have been
well documented in the literature. Having an exercise
facility open convenient hours was rated most important by
the 172 regular exercisers in this study, followed by having
an exercise location convenient to one's home and
availability of time to exercise. Not surprisingly,
convenience in terms of ability to exercise at any given
hour and at a location near one's home strongly influences
whether or not one can not only initiate an exercise program
but also whether one can sustain that exercise effort.
Interestingly, having an exercise location convenient to
work was not rated as very important, ranked number 9 out of
13.

Social support in previous studies has been
demonstrated to be of importance in sustaining an exercise
program. In this study, social support was ranked high, as

exercisers ranked having a spouse who is supportive of their exercise (ranked 4th) higher than having a spouse to exercise with (ranked 8th). Apparently, having a spouse supportive of exercise, i.e., supportive of the extra time required for an exercise regimen, is more needed than having a spouse to exercise with. Interestingly, exercise as a time to be by myself (ranked 5th) followed spouse support, and ranked higher than other means of social support. Apparently, a significant number of exercisers use their exercise activity as a time away from other people. Having friends to exercise with (ranked 6th) is slightly more important than having friends who are supportive of exercise (ranked 7th). And finally, social support in terms of co-worker influence is noted as negligible. Having co-workers to exercise with (ranked 11th) was ranked only slightly higher than having co-workers who are supportive of exercise (ranked 12th). Ranked last (13th) was preference for a supervised exercise setting. Apparently, exercisers in this study did not need or value someone to teach or coach them in their exercise program.

In summary then, exercisers in this study were successful at adhering to an exercise program because they exercised at a location that was close to home, had the time to exercise and had a spouse who encouraged that they take the time to exercise. And finally, many of them used that time as a time to be by themselves.

Factors which enhance one's ability to adhere to exercise have been identified. Future research needs to

focus on factors such as time, convenience, and social support to determine how they affect the adherence process. Exercise as a time to be by one's self also needs further exploration.

Research Question Three

Can adherence to exercise be predicted by motivation, locus of control, and/or self-esteem? This question focused attention on adherers, individuals who self-reported adherence to a physical activity for at least six months. Who are the people who are able to adhere? Are they more motivated, or have higher self-esteem, or more internally motivated than people who do not adhere? Examination of the discriminant function extracted yielded non-significance. These personality measures did not discriminate between adherers and non-adherers. However, caution must be used in interpretation of these results. One hundred and ninety five subjects identified themselves as adherers, and only 61 identified themselves as nonadherers. This group size difference might account for the non-significance of this research finding. Additionally, as was stated in the discussion related to research question one, all levels of exercise were included in the analysis. Light, moderate, and vigorous levels of exercise were used to define adherence. One might argue again that while vigorous levels of adherence exercise depend upon increasing levels of self-esteem, motivation, and locus of control, more moderate levels of exercise adherence do not.

The findings of this study then, support previous research in adherence behavior with the exception of the variable motivation. Previous research related to locus of control and self-esteem have found these personality traits to be limited in their ability to predict exercise adherence. Self-esteem predicts exercise participation, but its influence on adherence is unknown at this time. Previous studies have documented that exercisers have a more internal locus than non-exercisers, but internality has not been a consistent predictor of exercise adherence. Motivation has been a strong predictor of both participation and adherence in past research, but failed to predict in this study.

Problems and Limitations

Problems and limitations of this study need to be addressed in order to enhance future research. The first limitation important to consider is the generalizability of results from the population used in this study to either other non-college populations or traditional college populations. As stated previously, this study used participants from a commuter community junior college. As such, students were older (mean age 24) than samples from previous research utilizing college students. The range of age was restricted, as was diversity of population in terms of racial and cultural background, and socioeconomic status. The population was also restricted in terms of weight, as young adults do not evidence the same levels of obesity as middle-aged populations. And because exercise activity

decreases with age, level of activity in the reported population would be expected to be somewhat higher than the general population.

Another limitation of the study was the use of self-report instruments to measure self-esteem, locus of control, motivation, and intensity, frequency, and mode of exercise. Personality research is limited by its reliance on subjective reporting, as is exercise research. Exercise which occurs in a supervised setting can be documented by personnel, but exercise that is spontaneous is reliant upon self-reporting. Self-reporting of exercise is also effected by each participant's ability to accurately remember past and current exercise behavior. Vigorous levels of exercise might be remembered with more accuracy, as compared to light and moderate activity which resembles more of a daily routine, and therefore is not as distinct a memory pattern.

Experimental research needs to be conducted in order to clearly understand the influence of these personal and environmental variables on exercise adoption and adherence. Controlled studies where cause and effect can be determined need to be conducted in order to understand the effect of each of these variables on exercise behavior. Are motivation, self-esteem, and locus of control by-products of exercise, or do they impact the development of exercise habit? Longitudinal studies need to be conducted to study the effect of each of these variables at various stages of exercise. Different variables might affect exercise adoption, and others might best enhance exercise adherence.

The present study utilized static measures and was therefore
unable to determine variations in performance.

REFERENCES

Abbott, A.V., Peters, R.K., & Vogel, M.E. (1990). Type A behavior and exercise: a follow-up study of coronary patients. Journal of Psychosomatic Research, 34, 153-162.

Altman, H., Brown, M.L., & Sletten, I.W. (1972). And ... silently steal away. Diseases of the Nervous System, 33, 52-58.

Andrew, G.M. (1981). Reasons for dropout from exercise programs in post coronary patients. Medical Science in Sports and Exercise, 13, 164-168.

Baekeland, F., & Lundwall, L. (1975). Dropping out of treatment: A critical review. Psychological Bulletin, 82, 738-783.

Ballard-Barbash, R., Schatzkin, A., & Albanes, D. (1990). Phyical activity and risk of large bowel cancer in the Framingham Study. Cancer Research, 50, 3610-3613.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. Psychology Review, 84, 191-215.

Barke, C.R., & Nicholas, D.R. (1990). Physical activity in older adults: The stages of change. Journal of Applied Gerontology, 9, 216-223

Becker, M.H., & Maiman, L.A. (1975). Sociobehavioral

determinants and compliance with health care and medical care recommendations. <u>Medical Care,</u> <u>13,</u> 10-24.

Blumenthal, J.A. (1982). Physiological and psychological variables predict compliance to prescribed exercise therapy in patients recovering from myocardial infarction. <u>Psychology in Medicine,</u> <u>6,</u> 519-527.

Bouchard, C., & Malina, R.M. (1983). Genetics of physiogical fitness and motor performance. <u>Medical Science in Sports and Exercise,</u> <u>11,</u> 306-339.

Brownell, K., Stunkard, A.J., & Albaum, J. (1980). Evaluation and modification of exercise patterns in the natural environment. <u>American Journal of Psychology,</u> <u>137,</u> 1540-1545.

Budd, R., & Spencer, C. (1984). Latitude of rejection, centrality, and certainty: Variables affecting the relationship between attitudes, names and behavioral intentions. <u>British Journal of Social Psychology,</u> <u>23,</u> 1-8.

Caine, T.M., Wijesinghe, B., & Wood, R.R. (1973). Personality and psychiatric treatment expectancies. <u>British Journal of Psychiatry,</u> <u>122,</u> 87-88.

Caspersen, C., & DiPietro, L. (1991). National estimates of physical activity among older adults. <u>Medicine and Science in Sports and Exercise,</u> <u>23,</u> 106.

Collingwood, T.R. (1983). Caronical correlation analysis of clinical and psychological data in 4,351 men and women. <u>Journal of Cardiac Rehabilitation,</u> <u>3,</u> 706-711.

Council on Scientific Affairs (1989). Treatment of obesity in adults. Journal of American Medicine, 260, 2547-2551.

Cox, M. H. (1984). Fitness and life-style programs for business and industry: Problems in recruitment and retention. Journal of Cardiac Rehabilitation, 4, 136-142.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297-334.

Crowne, D.P., & Marlowe, D. (1964). The approval motive: studies in evaluative dependence. New York: John Wiley and Sons.

Daltroy, L.H. (1985). Improving cardiac patient adherence to exercise regimens: a clinical trial of health education. Journal of Cardiopulmonary Rehabilitation, 9, 846-853.

Davis, K. E., Jackson, K.L., Kronfeld, J.J., & Blair, S. N. (1984). Intent to participate in worksite health promotion activities: A model of risk factors and psychosocial variables. Health Education Quarterly, 11, 361-377.

Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. Psychology Reports, 59, 1155-1159.

Dishman, R.K. (1976). Aerobic power, estimation of physical ability, and attraction to physical activity. Research Quarterly for Exercise and Sport, 49, 285-292.

Dishman, R.K. (1981). Prediction of adherence to habitual

physical activity. In F.J. Nagle, H.J. Montoye, & C.C. Thomas (Eds.)., <u>Exercise in health and disease</u> (pp. 106-141). Springfield: IL.

Dishman, R.K. (1981). Biological influences on exercise adherence. <u>Research Quarterly in Exercise and Sports, 52,</u> 143-159.

Dishman, R.K. (1982). Compliance/adherence in health-related exercise. <u>Health Psychology, 1,</u> 237-267.

Dishman, R.K. (1984). Motivation and exercise adherence. In Silva, J., & Weinberg, R. (Eds.)., <u>Psychological foundations of sport</u> (pp. 416-430). Human Kinetics Publications, Champaign: IL.

Dishman, R.K. (1985). Medical psychology in exercise and sport. <u>Medical Clinics of North America, 69(1),</u> 123-143.

Dishman, R.K. (1988). <u>Exercise adherence: Its impact on public health.</u> Champaign, IL: Human Kinetics.

Dishman, R.K., & Gettman, L. R. (1980). Psychobiologic influences in exercise adherence. <u>Journal of Sport Psychology, 2,</u> 295-310.

Dishman, R.K. & Ickes, W.D. (1981). Self-motivation and adherence to therapeutic exercise. <u>Journal of Behavioral Medicine, 4,</u> 421-438.

Dishman, R.K., Ickes, W. J., & Morgan, W. P. (1980). Self-motivation and adherence to habitual physical activity. <u>Journal of Applied Social Psychology, 10,</u> 115-131.

Dishman, R.K., Sallis, J. F., & Orenstein, D. R. (1985). The determinants of physical activity and exercise.

Public Health Reports, 100, 158-171.

Dishman, R.K., & Steinhardt, M. (1988). Reliability and concurrent validity for a seven day recall of physical activity in college students. Medicine and Science in Sports and Exercise, 20, 14-25.

Dishman, R.K., & Steinhardt, M. (1990). Health locus of control predicts free-living, but not supervised, physical activity: a test of exercise-specific control and outcome-expectancy hypotheses. Research Quarterly in Exercise and Sports, 6, 383-394.

Dubbert, P.M., Stetson, B., & Corrigan, S.A. (1991). Predictors of exercise maintenance in community women. Journal of Sports Medicine, 12, 388-405.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Folkins, C.H. & Sime, W.E. (1981). Physical fitness training and mental health. American Psychologist, 36, 373-389.

Folsom, R.R., Caspersen, C.J., & Taylor, H.L. (1985). Leisure time phyical activity and its relationship to coronary risk factors in a population-based survey. American Journal of Epidemiology, 121, 570-579.

Gartside, P.S., Khoury, P., & Glueck, C.J. (1984). Determinants of high-density lipoprotein cholesterol in blacks and whites: the second National Health and Nutrition Examination Survey. American Heart Journal, 108, 641.

Giese, H. & Schomer H.H. (1986). Life-style changes and mood profile of cardiac patients after an exercise rehabilitation program. Journal of Cardiopulmonary Rehabilitation 6, 30-37.

Godin, G., Shephard, R.J., & Golantonia, A. (1986). The cognitive profile of those who intend to exercise but do not. Public Health Reports, 101, 521-526.

Godin, G., Valois, P., Shephard, R.J., & Desharnais, R. (1987). Prediction of leisure-time exercise behavior: a path analysis (LISREL V) model. Journal of Behavioral Medicine, 10, 145-158.

Harris, D.V. (1970). Physical activity history and attitudes of middle-aged men. Medicine and Science in Sports and Exercise, 2, 203-208.

Harris, D.M., & Guten, S. (1979). Health-protective behavior: An exploratory study. Journal of Health and Social Behavior, 20, 17-29.

Harter, S. (1983). Developmental perspectives on the self-system. In: E.M. Heterington (Ed.), Handbook of Child Psychology. New York: John Wiley.

Heilbrun, A.B. (1973). History and self-disclosure in females and early detection from psychotherapy. Journal of Counseling Psychology, 20, 250-257.

Hedback, B., & Perk, J. (1987). Five-year results of a comprehensive rehabilitation programme after myocardial infarction. Journal of Cardiac Rehabilitation, 8, 234-242.

Heinzelman, F., & Bagley, R.W. (1970). Response to

physical activity programs and their effects on health
behavior. Public Health Reports, 86, 905-911.

Hughes, J.R. (1984). Psychological effects of habitual
exercise: a critical review. Preventive Medicine, 13,
66-78.

Hunt, W.A., & Bespalec, D.A. (1974). An evaluation of
current methods of modifying smoking behavior. Journal
of Clinical Psychology, 30, 431-438.

Inger, F., & Dahl, H.A. (1979). Dropouts from an endurance
training program. Journal of Sports Science, 1, 20-22.

Janz, N. K., & Becker, M. H. (1984). Health Education
Quarterly, 11, 1-47.

Kaplan, R. M., Atkins, C. J., & Reinsch, S. (1984). Specific
efficacy expectations mediate exercise compliance in
patients with COPD. Health Psychology, 3(3), 223-242.

Keefe, F.J., & Blumenthal, J.A. (1980). The life fitness
program: A behavioral approach to making exercise a
habit. Journal of Behavior Therapy and Experimental
Psychiatry, 11, 31-34.

Kendzierski, D. (1990). Exercise self-schemata: Cognitive
and behavioral correlates. Health Psychology, 9, 69-
92.

Keys, A., Fidanza, F., Karvonen, M.J., Kimura, N.., &
Taylor, H.L. (1972). Indices of relative weight and
obesity. Journal of Chronic Disease, 25, 329-343.

Kilty, K.M. (1978). Attitudinal and normative variables as
predictors of drinking behavior. Journal of Studies on
Alcohol, 39, 1178-1194.

King A.C., & Tribble, D. (1991). The role of exercise in weight maintenance in non-athletes. Journal of Sports Medicine, 11, 331-349.

King, A.C., Blair, S.N., Bild, D.E., Dishman, R.K., Dubbert, P.M., Marcus, B.H., Oldridge, N.B., Paffenbarger, R.S., Powell, K.E., & Yeager, K.K. (1992). Determinants of physical activity interventions in adults. Medicine and Science in Sports and Exercise, 24, 221-236.

King, A.C., Taylor, C.B., Haskell, W.L., & DeBusk, R.F. (1988). Strategies for increasing early adherence to and long-term maintenance of home-based exercise training in healthy middle-aged men and women. American Journal of Cardiology, 61, 628-632.

King, A.C., Taylor, C.B., Haskell, W.L., & DeBusk, R.F. (1990). Identifying strategies for increasing employee physical activity levels: findings from the Stanford/Lockheed exercise survey. Health Education Quarterly, 17, 269-285.

Knapp, D.N. (1988). Behavioral management techniques and exercise promotion. In: R.K. Dishman (Ed.), Exercise Adherence: Its impact on public health (pp. 203-236). Champaign, IL: Human Kinetics.

Leon, A.S., Connell, J., Jacobs, D.R., & Rauramaa, R. (1987). Leisure-time physical activity levels and risk of coronary heart disease and death. Journal of American Medical Association, 258, 2388-2395.

Lindsay-Reid, E., & Osborn, R.W. (1980). Readiness for exercise adoption. Social Sciences in Medicine, 14,

139-146.

Loy, J.W., McPherson, B., & Kenyon, G. (1978). Sport and social systems. Philadelphia, PA: W.B. Saunders and Company, Inc.

Martin, J.E. & Dubbert, P.M. (1982). Exercise applications and promotion in behavioral medicine: current status and future directions. Journal of Consulting Clinical Psychology, 50, 1004-1017.

Massie, J.F., & Shephard, R.J. (1971). Physiological and psychological effects of training: a comparison of individual and gymnasium programs, with a characterization of the exercise "dropout." Medicine and Science in Sports, 3, 110-117.

Mathews, K.A., Kelsey, S.F., Meilahn, E.N., Kuller, L.H., & Wing, R.R. (1989). Educational attainment and behavioral and biologic risk factors for coronary heart disease in middle-aged women. American Journal of Epidemiology, 129, 1132-1144.

Mehrabian, A. (1968). Male and female scales of the tendency to achieve. Educational and Psychological Measurement, 28, 493-502.

Miller, P., & Wikoff, R. (1989). Personal adjustments and regimen compliance one year after myocardial infarction. Heart Lung 18, 339-346.

Montoye, H.J. (1975). Physical activity and health: an epidemiological study of an entire community. Englewood Cliffs, N.J: Prentice-Hall.

Morgan, W.P. (1977). Involvement in vigorous physical

activity with special reference to adherences. In L.I.
Gedvillas & M.E. Kneer (Eds.), National College
Physical Education Association Proceedings (pp. 235-
246). Chicago: University of Illinois-Chicago.

Morgan, W.P. (1979). Negative addiction in runners.
Physicians in Sports Medicine, 7, 57-70.

Morgan, W.P. (1985). Affective beneficience of vigorous
physical activity. Medicine and Science in Sports and
Exercise, 17, 94-100.

Morgan, W.P., & Pollock, M.L. (1978). Physical activity and
cardiovascular health: Psychological aspects. In F.
Laundry & Orban (Eds.), Physical activity and human
well-being (pp. 163-181). Miami: Symposium
Specialists.

Morgan, W.P., Shephard, R.J., & Finucane, R. (1984). Health
beliefs and exercise habits in an employee fitness
programme. Canadian Journal of Applied Sports
Science, 9, 87-93.

Morgan, W.P., & Goldston, S.N. (Eds.). (1987). Exercise and
mental health. Washington, D.C.: Hemisphere. Oldridge,
N.B. (1982). Compliance and exercise in primary and
secondary prevention of coronary heart disease: a
review. Preventive Medicine, 11, 56-70.

Oldridge, N.B. (1983). Predictive indices for dropout: the
Ontario Exercise Heart Collaborative Study Experience.
American Journal of Cardiology, 51, 70-74.

Oldridge, N.B., Donner, A.P., Buck, C.W., & Jones, N.L.
(1983). Predictors of dropout from cardiac exercise

rehabilitation. American Journal of Cardiology, 51, 70-74.

Oldridge, N.B., & Spencer, J. (1985). Exercise habits and perceptions before and after graduation or dropout from supervised cardiac rehabilitation. Journal of Cardiopulmonary Rehabilitation, 5, 313-319.

Oldridge, N.B. & Streiner, D. (1990). Health belief model as a predictor of compliance with cardiac rehabilitation. Medicine and Science in Sports and Exercise, 22, 678-647.

Olson, J.M., & Zanna, M.P. (1982). Predicting adherence to a program of physical exercise: An empirical study. Research Quarterly, 40, 743-749.

Perusse, L.A., Tremblay, A., Leblanc, C., & Bouchard, C. (1989). Genetic and environmental influences on level of habitual physical activity and exercise participation. American Journal of Epidemiology, 129, 1012-1022.

Phares, E.J. (1957). Expectancy changes in skill and chance situations. Journal of Abnormal and Social Psychology, 54, 339-342.

Powell, K.E. (1988). Habitual exercise and public health: An epidemiological view. In R.K. Dishman (Ed.), Exercise Adherence: Its impact on public health (pp. 15-34). Champaign, IL: Human Kinetics.

Raglin, J.S., Morgan, W.P., & Luchsinger, A.E. (1990). Mood and self-motivation in successful and unsuccessful female rowers. Medicine and Science in Sports and

Exercise, 22, 849-853.

Reaven, P.D., McPhillips, J.B., Barrett-Connor, E.L., & Crizui, M.H. (1990). Leisure time exercise and lipid and lipoprotein levels in an older population. Journal of American Geriatric Society, 38, 847-854.

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

Rosenstock, I.M. (1966). Why people use health services. Psychological Monographs, 80 (Whole No. 609).

Rosenstock, I.M. (1974). Historical origins of the health belief model. Health Education Monographs, 2, 328-335.

Rotter, J.B., Liverant, S., & Crowne, D.P. (1961). The growth and extinction of expectancies in chance controlled and skilled tests. Journal of Psychology, 52, 161-177.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, 328-335.

Rotter, J.B. (1992). Some comments on the "cognates of personal control". Applied and Preventive Psychology, 1, 127-129.

Sallis, J.F., Haskell, W.L., & Fortmann, S.P. (1986). Predictors of adoption and maintenance of physical activity in a community sample. Preventive Medicine, 15, 331-341.

Sallis, J.F., Haskell, W.L., & Wood, P.D. (1986). Physical activity assessment methodology in the Five-City Project. American Journal of Epidemiology, 121, 91-106.

Sallis, J.F., Hovell, M.F., Hofstetter, C.R., & Faucher, P. (1989). A multivariate study of determinants of vogorous exercise in a community sample. Preventive Medicine, 18, 20-34.

Saltzer, E.B. (1982). The weight locus of control (WLOC) scale: A specific measure for obesity research. Journal of Personality Assessment, 46, 620-628.

Scalzi, C.C., Burke, L.E., & Greenland, S. (1980). Evaluation of an inpatient educational program for coronary patients and families. Journal of Behavioral Medicine, 9, 846-853.

Schoenborn, C.A. (1986). Health habits of U.S. adults: the "Alameda 7" revisited. Public Health Reports, 101, 571-580.

Shavelson, R.J., Hubner, J.J., & Stanton, G.C. (1976). Self-concept: validation of construct interpretations. Review of Education Research, 46, 407-441.

Shephard, R.J., & Cox, M. (1980). Some characteristics of participants in an industrial fitness programme. Canadian Journal of Applied Sports Science, 5, 69-76.

Sherman, S.J., Presson, C.C., Chassin, L., Bensenberg, M., Corty, E., & Olshavsky, R.W. (1982). Smoking intentions in adolescents: Direct experience and predictability. Personality and Social Psychology

Bulletin, 8, 376-383.

Siscovick, D.S., Laporte, R.E., & Newman, J.M. (1985). The disease-specific benefits and risks of physical activity and exercise. Public Health Reports, 100, 180-188.

Slenker, S. E., Price, J. H., Roberts, S. M., & Jurs, S. G. (1984). Joggers versus non-exercisers. Research Quarterly for Exercise and Sport, 55, 371-378.

Sonstroem, R. J. (1974). Attitude testing examining certain psychological correlates of physical activity. Research Quarterly, 45, 93-103.

Sonstroem, R. J. (1976). The validity of self-perceptions regarding physical and athletic ability. Medicine and Science in Sports, 8, 126-132.

Sonstroem, R. J. (1978). Physical estimation and attraction scales: Rationale and research. Medicine and Science in Sports, 10, 97-102.

Sonstroem, R. J. (1984). Self-esteem and physical activity. In R.L. Terjung (ed.), Exercise and sport sciences reviews (Vol. 12, pp. 123-255). Lexington, MA: Collomore Press.

Sonstroem, R. J. (1988). Psychological models. In R. K. Dishman (ed.), Exercise adherence: Its impact on public health (pp. 125-153). Champaign, IL: Human Kinetics.

Sonstroem, R.J., & Morgan, W.P. (1989). Exercise and self-esteem: rationale and model. Medicine and Science in Sports and Exercise, 21, 329-337.

Sonstroem, R.J., & Walker, M.I. (1973). Relationship of

attitudes and locus of control to exercise and physical fitness. <u>Perceptual</u> <u>and</u> <u>Motor</u> <u>Skills,</u> <u>36,</u> 1031-1034.

Stegman, M.R., Miller, J..P., & Hageman, R.K. (1987). Myocardial infarction survival: how important are patient's attitudes and adherence behviors? <u>Preventive</u> <u>Medicine,</u> <u>3,</u> 147-151.

Stephens, T., Jacobs, D.R., & White, C.C. (1985). The descriptive epidemiology of leisure-time physical activity. <u>Public</u> <u>Health</u> <u>Reports,</u> <u>100,</u> 147-158.

Stevens, J. (1992). <u>Applied</u> <u>multivariate</u> <u>statistics</u> <u>for</u> <u>the</u> <u>social</u> <u>sciences.</u> Hillsdale, NJ: Erlbaum.

Taylor, C.B., Sallis, J.F., & Needle, R. (1985). The relationship between physical activity and exercise and mental health. <u>Public</u> <u>Health</u> <u>Reports,</u> <u>100,</u> 195-202.

Teraslinna, P. (1969). Characteristics affecting willingness of executives to participate in an activity program aimed at coronary heart disease prevention. <u>Journal</u> <u>of</u> <u>Sports</u> <u>Medicine</u> <u>in</u> <u>Physical</u> <u>Fitness,</u> <u>9,</u> 224-229.

Thomas, P., & Zander, A. (1973). Thomas-Zander ego strength scales. In: J.P. Robinson & P.R. Shaver (Eds.), <u>Measures</u> <u>of</u> <u>social</u> <u>psychological</u> <u>attitudes.</u> Ann Arbor: Institute for Social Research.

Thompson, D.R. & Meddis, R. (1990). A prospective evaluation of in-hospital counseling for first time myocardial infarction. <u>Journal</u> <u>of</u> <u>Psychosomatic</u> <u>Medicine,</u> <u>34,</u> 237-248.

Wallston, K.A. (1978). Locus of control and health: A

review of the literature. Health Education Monographs, 6, 107-117.

Wallston, K.A., Wallston, B.S., & DeVellis, R. (1978). Development of the multidimensional health locus of control (MHLC) scales. Health Education Monographs, 6, 160-170.

Wallston, B.S., Wallston, K.A., Kaplan, G.D., & Maides, S.A. (1976). Development and validation of the health locus of control (HLC) scales. Journal of Consulting Clinical Psychology, 44, 580-585.

Wankel, I.M. (1984). Decision-making and social-support strategies for increasing exercise involvement. Journal of Cardiac Rehabilitation, 4, 124-135.

Ward, A., & Morgan, W.P. (1984). Adherence patterns of healthy men and women enrolled in an adult exercise program. Journal of Cardiac Rehabilitation, 4, 143-152.

Weinberg, R.S., Hughes, H.H., Critelli, J.W., England, R., & Jackson, A. (1984). Effects of preexisting and manipulated self-efficacy on weight loss in a self-control program. Journal of Research in Personality, 18, 352-358.

Wieland, W.F., & Novack, J.L. (1973). A comparison of criminal justice and noncriminal justice related patients in a methadone treatment program. Journal of Applied Social Psychology, 7, 332-340.

Wylie, R.C. (1974). The Self-Concept: a review of methodological considerations and measuring instruments.

Lincoln: University of Nebraska Press.

Zax, M. (1962). The incidence and fate of the reopened case in an alcoholism treatment center. <u>Quarterly</u> <u>Journal</u> <u>of</u> <u>Studies</u> <u>on</u> <u>Alcohol,</u> <u>23,</u> 634-639.

APPENDIX A

IRB APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
FOR HUMAN SUBJECTS RESEARCH

Date: 03-30-93   **IRB#:**   ED-93-074

Proposal Title: FACTORS RELATED TO EXERCISE BEHAVIOR

Principal Investigator(s):   John Romans, Cathy Furlong

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s):   Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW
BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A
CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR
BOARD APPROVAL.   ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO
BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for
Deferral or Disapproval are as follows:

Signature: *Marcia L. Tilley*   Date: April 12, 1993
      Chair of Institutional Review Board

APPENDIX B

VOLUNTEER SOLICITATION FORM

VOLUNTEER SOLICITATION FORM

This study is being conducted to identify personal, and environmental characteristics of those who participate in an exercise regimen.

All phases of the study will be fully explained in class to provide an example of an actual research study. If you choose to participate, you will be asked to complete a series of four questionnaires. Completing these questionnaires will take approximately 50 minutes. All of your responses will be placed in the envelope provided, and then returned to the investigator. Your responses are all anonymous.

There is absolutely no penalty for non-participation. Your participation is completely voluntary. Students willing to participate in the study will be required to complete the subject consent form on the next page.

APPENDIX C

CONSENT FORM

CONSENT FORM

I, _____ , voluntarily agree
to participate in the above titled research.

I understand that:

1) the purpose of the study is to identify personal
   and environmental characteristics of those who adhere to
   exercise;

2) I will be requested to complete four questionnaires
   which will take approximately 50 minutes;

3) each questionnaire is completely anonymous;

4) my instructor will not see what I have written,
   information I have revealed will be sealed in an
   envelope and handed directly to the investigator;

5) all records are confidential and will be destroyed once
   data have been entered into a computer file;

6) my participation or failure to participate in this study
   will not affect my grade in this course in any way;

7) participation is voluntary and I have the right to
   withdraw from this study at any time without penalty;

8) this study will provide an in-class example of the
   research process;

9) I may contact Dr. John Romans, Applied Behavioral
   Studies, 317 Murray Hall, Oklahoma State University,
   (405) 744-6036 should I have any questions about this
   study. I may also contact University Research Services,
   001 Life Sciences East, Oklahoma State University, (405)
   744-6983.

I have read and fully understand the consent form. I sign
it freely and voluntarily. A copy has been given to me.

Signed _____   Date _____

_____ Check here if you want feedback regarding the results of this study when they are available. Include your mailing address only if you want feedback.

_____
(Name)

_____
(Address)

_____
(City, State, Zip)

APPENDIX D

DEMOGRAPHIC QUESTIONNAIRE

DEMOGRAPHIC QUESTIONNAIRE

Age: _____   Male: _____   Female: _____

Married: _____   Single: _____   Gross Annual Income:
$_____
(Individual)

Hours of college education completed:
0-30 hours	_____
31-60 hours	_____
61-90 hours	_____
91-140 hours	_____
Bachelor's completed	_____
Master's completed	_____
Doctorate completed	_____

Weight: _____   Height: _____

1. Do you currently smoke?

___ no   ___ cigar/pipe   ___ chew
___ 1-10 cigarettes per day
___ 11-20 per day
___ 21-30 per day
___ 31-40 per day
___ more than 40 per day

2. Do you participate in any of the following activities?

Activity	Frequency (Days per week)						
	1	2	3	4	5	6	7
___ climbing stairs instead of taking elevator	—	—	—	—	—	—	—
___ walking instead of driving a short distance	—	—	—	—	—	—	—
___ parking away from your destination so you have to walk	—	—	—	—	—	—	—
___ walking on your lunch hour or after dinner	—	—	—	—	—	—	—
___ ping-pong	—	—	—	—	—	—	—
___ golf	—	—	—	—	—	—	—
___ stretching exercises	—	—	—	—	—	—	—
___ occupation involving light to moderate physical activity (examples: delivering mail, house painting, lifting and carrying light objects.)	—	—	—	—	—	—	—
___ light household activities (examples: raking or mowing the lawn; sweeping, vacuuming, mopping)	—	—	—	—	—	—	—

3. **Concerning the types of activities you identified in question #2, how long have you performed each type of activity?**

	30 days or less	1-5 months	6 months or more
___ climbing stairs instead of taking elevator	___	___	___
___ walking instead of driving a short distance	___	___	___
___ parking away from your destination so you have to walk	___	___	___
___ walking on your lunch hour or after dinner	___	___	___
___ ping-pong	___	___	___
___ golf	___	___	___
___ stretching exercises	___	___	___
___ occupation involving light to moderate physical activity (examples: delivering mail, house painting, lifting and carrying light objects.)	___	___	___
___ light household activities (examples: raking or mowing the lawn; sweeping, vacuuming, mopping)	___	___	___

4. **Which of the following VIGOROUS activities have you performed?**

Activity	Frequency (Days per week)						
	1	2	3	4	5	6	7
___ occupation involving vigorous activity (heavy carpentry, construction work, digging or chopping with heavy tools; carrying heavy loads such as bricks or lumber)	__	__	__	__	__	__	__
___ moderate-to-heavy household tasks (scrubbing floors; heavy yard work)	__	__	__	__	__	__	__
___ jog or run at least 20 minutes	__	__	__	__	__	__	__
___ play strenuous racquet sports (singles tennis, paddle ball, etc)	__	__	__	__	__	__	__
___ play other vigorous sports (basketball, soccer, etc)	__	__	__	__	__	__	__
___ ride a bicycle at least 20 minutes	__	__	__	__	__	__	__
___ swim at least 20 minutes	__	__	__	__	__	__	__
___ aerobic exercise at least 20 minutes	__	__	__	__	__	__	__
___ other: _____	__	__	__	__	__	__	__

5. **How long have you been performing each vigorous activity identified in question #4?**

	30 days or less	1-5 months	6 months or more
___ occupation involving vigorous activity (heavy carpentry, construction work, digging or chopping with heavy tools; carrying heavy loads such as bricks or lumber)	___	___	___
___ moderate-to-heavy household tasks (scrubbing floors; heavy yard work)	___	___	___
___ jog or run at least 20 minutes	___	___	___
___ play strenuous racquet sports (singles tennis, paddle ball, etc)	___	___	___
___ play other vigorous sports (basketball, soccer, etc.)	___	___	___
___ ride a bicycle at least 20 minutes	___	___	___
___ swim at least 20 minutes	___	___	___
___ aerobic exercise at least 20 minutes	___	___	___
___ other: _____	___	___	___

6. **People who exercise regularly (at least 3 times/week) do so for various reasons. How important are the following in influencing your ability to exercise regularly?**

____ Check here if you do not exercise regularly --STOP

	Very Important	Somewhat Important	Not Important
exercise location is convenient to my home	___	___	___
exercise location is convenient to my work	___	___	___
having friends who are supportive of my exercise	___	___	___
having friends to exercise with	___	___	___
having co-workers who are supportive of my exercise	___	___	___
having co-workers to exercise with	___	___	___
having a spouse who is supportive of my exercise	___	___	___
having a spouse to exercise with	___	___	___
exercise facility open convenient hours	___	___	___

	<u>Very</u> <u>Important</u>	<u>Somewhat</u> <u>Important</u>	<u>Not</u> <u>Important</u>
exercise is a time to be by myself	____	____	____
I prefer a supervised exercise setting	____	____	____
availability of time to exercise	____	____	____
other: _____	____	____	____

APPENDIX E

SELF-REPORT QUESTIONNAIRE

SELF-REPORT QUESTIONNAIRE

DIRECTIONS: Read each of the following statements and then blacken the appropriate number to the right of the statement to indicate how it best describes you. Please be sure to answer every item and try to be as honest and accurate as possible in your responses. There are no right or wrong answers. Your answers will be kept in the strictest confidence.

		Very unlike me	Some-what unlike me	Neither like me nor un-like me	Some-what like me	Very much like me
1.	I'm not very good at committing my-self to do things.	1	2	3	4	5
2.	Whenever I get bored with pro-jects I start, I drop them to do something else.	1	2	3	4	5
3.	I can persevere at stressful tasks, even when they are physically tiring or painful.	1	2	3	4	5
4.	If something gets to be too much of an effort to do, I'm likely to just forget it.	1	2	3	4	5
5.	I'm really concern-ed about developing and maintaining self-discipline.	1	2	3	4	5
6.	I'm good at keeping promises, especially the ones I make to myself.	1	2	3	4	5
7.	I don't work any harder than I have to.	1	2	3	4	5
8.	I seldom work to my full capacity.	1	2	3	4	5

		Very unlike me	Some- what unlike me	Neither like me nor un- like me	Some- what like me	Very much like me
9.	I'm just not the goal setting type.	1	2	3	4	5
10.	When I take on a difficult job, I make a point of sticking with it until it's completed.	1	2	3	4	5
11.	I'm willing to work for things I want as long as it's not a big hassle for me.	1	2	3	4	5
12.	I have a lot of self-motivation.	1	2	3	4	5
13.	I'm good at mak- ing decisions and standing by them.	1	2	3	4	5
14.	I generally take the path of least resistance.	1	2	3	4	5
15.	I get discouraged easily.	1	2	3	4	5
16.	If I tell some- body I'll do some- thing, you can de- pend on it being done.	1	2	3	4	5
17.	I don't like to overextend my- self.	1	2	3	4	5
18.	I'm basically lazy.	1	2	3	4	5
19.	I have a very hard- driving, aggressive personality.	1	2	3	4	5

		Very unlike me	Somewhat unlike me	Neither like me nor unlike me	Somewhat like me	Very much like me
20.	I work harder than most of my friends.	1	2	3	4	5
21.	I can persist in spite of pain or discomfort.	1	2	3	4	5
22.	I like to set goals and work toward them.	1	2	3	4	5
23.	Sometimes I push myself harder than I should.	1	2	3	4	5
24.	I tend to be overly apathetic.	1	2	3	4	5
25.	I seldom if ever let myself down.	1	2	3	4	5
26.	I'm not very reliable.	1	2	3	4	5
27.	I like to take on jobs that challenge me.	1	2	3	4	5
28.	I change my mind about things quite easily.	1	2	3	4	5
29.	I have a lot of willpower.	1	2	3	4	5
30.	I'm not likely to put myself out if I don't have to.	1	2	3	4	5
31.	Things just don't matter much to me.	1	2	3	4	5
32.	I avoid stressful situations.	1	2	3	4	5

	Very unlike me	Some-what unlike me	Neither like me nor un-like me	Some-what like me	Very much like me
33. I often work to the point of ex-haustion.	1	2	3	4	5
34. I don't impose much structure on my activities.	1	2	3	4	5
35. I never force my-self to do things I don't feel like doing.	1	2	3	4	5
36. It takes a lot to get me going.	1	2	3	4	5
37. Whenever I reach a goal, I set a higher one.	1	2	3	4	5
38. I can persist in spite of failure.	1	2	3	4	5
39. I have a strong desire to achieve.	1	2	3	4	5
40. I don't have much self-discipline.	1	2	3	4	5

APPENDIX F

INTERNAL-EXTERNAL CONTROL SCALE

INSTRUCTIONS FOR THE I-E SCALE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you most strongly believe to be the case as far as you are concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowdays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.
    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.
    b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
    b. Getting people to do the right thing depends upon ability, luck has little of nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, not control.
    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
    b. There really is no such thing as "luck."

19. a. One should always be willing to admit mistakes.
    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.
    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things tht hapen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.
    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
    b. In the long run the people are responsible for bad government on a national as well as on a local level.

APPENDIX G

ROSENBERG SELF-ESTEEM SCALE

ROSENBERG SCALE

INSTRUCTIONS: Respond to each of following items by circling the appropriate number according to how strongly you agree or disagree with each statement.

1 = Strongly agree (SA); 2 = Agree (A); 3 = Disagree (D); and 4 = Strongly Disagree (SD).

		1 SA	2 A	3 D	4 SD
1.	I feel that I'm a person of worth, at least on an equal plane with others.	1	2	3	4
2.	I certainly feel useless at times.	1	2	3	4
3.	I feel that I have a number of good qualities.	1	2	3	4
4.	At times I think I am no good at all.	1	2	3	4
5.	All in all, I am inclined to feel that I am a failure.	1	2	3	4
6.	I am able to do things as well as most other people.	1	2	3	4
7.	I wish I could have more respect for myself.	1	2	3	4
8.	I feel I do not have much to be proud of.	1	2	3	4
9.	I take a positive attitude toward myself.	1	2	3	4
10.	On the whole, I am satisfied with myself.	1	2	3	4

\
VITA

CATHY LYNN FURLONG

Candidate for the Degree of

Doctor of Philosophy

Thesis: FACTORS RELATED TO EXERCISE BEHAVIOR: PERSONALITY
         FACTORS AND DEMOGRAPHIC CHARACTERISTICS

Major Field: Applied Behavioral Studies

Biographical:

    Personal Data: Born in Casper, Wyoming, February 14,
        1952, the daughter of Jim and Betty Furlong.

    Education: Graduated from Memorial Senior High School,
        Tulsa, Oklahoma in June, 1970; received Bachelor
        of Arts Degree in History from Oklahoma State
        University in 1974; received the Master of Science
        degree in Student Personnel and Guidance at
        Oklahoma State University in 1978; completed
        requirements for the Doctor of Philosophy degree
        in Applied Behavioral Studies at Oklahoma State
        University in December, 1994.

    Professional Experience: Full-time Faculty, Tulsa
        Junior College, 1988 - present; Director of
        Special Programs, Tulsa Junior College, 1984-1988;
        Residence Life Coordinator and Program
        Coordinator, Oklahoma State University, 1975-1982.

    Professional Organizations: American Psychological
        Association, Oklahoma Psychological Association.