FACTORS AFFECTING EXERCISE ADHERENCE AMONG PARTICIPANTS, 
NONPARTICIPANTS AND DROPOUTS OF A WORKSITE 
HEALTH AND FITNESS PROGRAM

THESIS

Presented to the Graduate Council of the 
University of North Texas in Partial 
Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

Katherine Cecil Orsak, B.B.A.
Denton, Texas
August, 1994
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This study examines the relationship between exercise adherence and several factors: self-motivation; attitudinal commitment; predisposing, enabling, and reinforcing (PER) factors; and barriers related to exercise.

The sample (N=431) consists of employees at Texas Instruments, Incorporated in Dallas, Texas. The sample was placed into six comparison groups: high adherers, low adherers, nonparticipants who exercise, nonparticipants who do not exercise, dropouts who exercise and dropouts who do not exercise.

Using a one-way ANOVA, the results show significance (p<.01) among the groups for: self-motivation and barriers. Attitudinal commitment and PER factors did not show significance. The results can be applied to worksite health programs to increase exercise adherence among employee populations.
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K.C.O.

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CHAPTER I

INTRODUCTION

Participation in corporate health and fitness programs has become widely accepted as an important means of improving physical and mental health (Morgan, Shephard, Finucane, Schimmelfing, & Jazmaji, 1984). Some of the personal benefits that have been attributed to regular physical activity include reduced risk of cardiovascular disease, increased self-esteem, lowered levels of stress, and continued weight maintenance (Blair, Jacobs, & Powell, 1985). Corporations have also gained benefits from employee participation in health and fitness programs. Extensive research has shown that employee participation in worksite wellness programs aids in reducing absenteeism, health care costs, turnover, as well as increasing worker productivity (Tsai, Baun, & Bernacki, 1987; Warner, Wickizer, Wolfe, Schildroth, & Samuelson, 1988).

The growing awareness of the mutual benefit of health and fitness programs for employees and corporations has led to an increased number of health-related programs implemented by worksites. Due to the insurgence of new worksite health programs, researchers have created a vast knowledge base on the costs and benefits of worksite wellness endeavors (Baun,
Bernacki, & Tsai, 1986). Even with the growth and improvements of new worksite wellness programs, the lack of employee participation remains a paramount problem for worksite wellness directors (Dishman, 1988).

Current estimates of the number of Americans participating in regular physical activity are alarmingly low. According to a 1978 Gallop Poll, only 47% of the people participated in physical activity on a regular basis (Gallup, 1978, p.12). Stephens, Jacobs, and White (1985) found that 40% of Americans do not exercise during leisure time at all, while an additional 40% of Americans do not attain the recommended levels of exercise for achieving and/or maintaining health benefits. The American Heart Association's position statement on exercise states that a person must participate in regular exercise a minimum of three to four times per week for approximately 30-60 minutes each time for health promotion (Fletcher, et al., 1992). The American College of Sports Medicine (ACSM) also promotes exercising a minimum of three times a week for cardiovascular fitness (ACSM, 1990). Furthermore, some benefits, such as reduced blood pressure and improved cardiovascular effects, last only to the extent to which the exercise is regularly maintained. The statistics show that only 20% of Americans exercise on a regular basis to acquire health and fitness gains (Stephens, Jacobs & White, 1985).

The above statistics for the U.S. population hold true
to the U.S. workforce, as well. Even though more corporations are adopting health and fitness programs, approximately 80% or more of the eligible workers do not take advantage of the worksite wellness programs. Of the 20% of workers who do participate, only half of them will remain participants of the worksite programs for the long term (Morgan et al., 1984; Song, Shephard, & Cox, 1982). Current research indicates that the majority of people who begin an exercise program will discontinue within the first six months of participation (Dishman, 1988; Martin & Dubbert, 1985).

Due to the growth of worksite wellness programs, a new avenue is available for health practitioners to reach a large portion of the sedentary population. Approximately 70% of the adult population aged 18 to 65 is employed (Centers for Disease Control [CDC], 1991, p. 85). The availability of resources and the increasing awareness of the health benefits of regular participation in health and fitness programs coupled with the rising health care costs due to chronic disease has led to a strong U.S. government commitment to improving the health of the U.S. population. The U.S. government's goals for the nation are to increase moderate daily physical activity to at least 30% of people and reduce sedentary lifestyles to not more than 15% of people by the year 2000 (U.S. Department of Health and Human Services, 1990).

It is imperative for researchers to identify the
determinants of employee participation in worksite programs in order to increase participation and adherence to the programs so that health benefits can be attained (Slenker, Price, Roberts, & Jurs, 1984). For health practitioners to be successful in increasing participant adherence in health and fitness programs, the factors that influence adherence must be determined. In addition, the health practitioner must be aware of the factors involved in exercise adherence during each of the four phases of the natural history of exercise: adoption, maintenance, drop-out, and resumption (Sallis & Hovell, 1990). Once the phase of exercise and the factors associated with exercise adherence in that phase are identified, it is possible to target the factors for positive behavior change. However, the determinants of exercise adherence at each phase may be different, thereby, making exercise adherence research complex (Sallis & Hovell, 1990).

The benefits of regular physical activity are widely known and are the primary purpose for undertaking health-promoting behavior. Despite the overwhelming evidence that regular physical activity contributes to improved health, the majority of Americans either do not choose to participate in regular exercise or discontinue exercise regimens once begun. What differentiates those individuals who adhere to regular physical activity from those who do not is still unclear.
Statement of the Problem

The problem of this study was to determine exercise adherence patterns of employees at Texas Instruments, Incorporated.

Purpose of the Study

This study was designed to examine the effects of five specific categories of variables as they relate to participant adherence in a worksite health and fitness program. Specifically, employees were measured on the following:

1) demographic factors: (age, gender, marital status, and current participation in physical activity)
2) self-motivation
3) attitudinal commitment to exercise
3) perceived barriers to exercise: (inconvenience, health problems, lack of time, lack of effort, and other obstacles)
4) predisposing, enabling, and reinforcing factors related to exercise behaviors
Significance of the Study

Due to the increasing number of worksite wellness programs developing in the United States, participant adherence research is becoming increasingly important. This presents ample opportunity to research adherence to wellness programs. The findings of this study can be made available to health practitioners, providing information regarding employees at risk for low adherence rates, enabling them to target these individuals through program changes and improved marketing efforts.

It is speculated that an improved participation rate for worksite wellness programs may lead to several beneficial effects. First, participation rates are frequently used as evaluation criteria for health programs. By enhancing participation rates, health and fitness programs will be considered more successful by upper management. Secondly, participation rates are frequently used as a basis for budget justification for funding of the worksite wellness programs. Thirdly, increased participation may result in increased employee health benefits, such as reduced cardiovascular disease, blood pressure, cholesterol levels, and obesity. Lastly, the corporations may benefit from increased participation through reduced health care costs, absenteeism, turnover, and increased employee morale.
Hypotheses

For the purposes of this study, the following hypotheses have been submitted:

1. There is a significant difference in the level of self-motivation among high adherers, low adherers, dropouts, and nonparticipants of an exercise program.

2. There is a significant difference in the level of attitudinal commitment among high adherers, low adherers, dropouts, and nonparticipants of an exercise program.

3. There is a significant difference in the predisposing, reinforcing, and enabling factors influencing behaviors related to exercise among high adherers, low adherers, dropouts, and nonparticipants of an exercise program.

4. There is a significant difference in the perceived barriers related to exercise adherence among high adherers, low adherers, dropouts, and nonparticipants of an exercise program.

Definition of Terms

1. Attitudinal Commitment: The extent to which an individual's identity is invested in being physically fit and committed to adhering to a physical fitness program (Snyder, 1983; Steinhardt & Carrier, 1989).

2. Coronary Heart Disease: The narrowing of the
arteries that supply blood to the actual heart muscle.

3. **Demographics**: Refers to the general background of the employee sample. The variables used for the purposes of this study include age, gender, job status, and marital status.

4. **Dropout**: Any individual who attended the worksite health and fitness facility and engaged in some form of health-related behavior one or more times and subsequently has discontinued participation.

5. **Exercise**: to put into action for the purposes of training or developing the body (McKechnie, 1979).

6. **Health and Fitness Program**: see Worksite Wellness program.

7. **High Adherer**: Refers to a person whose attendance in an exercise program averages three or more times per week (or eight or more times per month) (Shephard, 1988).

8. **Hypertension**: Blood pressure at or above the level of 140 diastolic over 90 systolic.

9. **Low Adherer**: Refers to a person whose attendance in an exercise program averages less than three times per week (or less than eight times per month) (Shephard, 1988).

10. **Nonparticipant**: Any individual who has never attended the worksite health and fitness facility and has never engaged in any health-related program on site.
12. **Participant**: Any individual who was currently attending the worksite health and fitness program at the time of the study.

13. **Physical Activity**: see Exercise

14. **Self-Motivation**: The tendency to persist at a task in the absence of extrinsic reinforcement (Dishman & Gettman, 1980).

15. **Social Support**: The existence or availability of people who contribute to the positive adjustment and personal development of an individual.

16. **Worksite Wellness Program**: Any health-related program which includes a fitness/exercise element offered on the property of the company. For the purposes of this study, this term is synonymous with a health and fitness program.

**Limitations**

1. Only individuals employed at Texas Instruments Incorporated during the time of this study will be surveyed.

2. Employees who have never participated in the worksite wellness program are more likely not to complete the questionnaire, therefore the response rate may be biased.

3. Surveys completed incorrectly will be discarded.

4. Since the researcher will not be present during the
administration of the questionnaire, conformance to
guidelines can only be assumed.

5. The minimum requirements that need to be met to
establish exercise adherence will not be measured in
this study because attendance at exercise sessions does
not constitute adequate exercise adherence unless the
exercise performance meets the specific exercise
requirements.

6. Only those individuals who participate in the Texins
Health and Fitness programs will be considered exercise
adherers. Therefore, those individuals who exercise
regularly at other facilities or at home will not be
included in this study.

7. The findings might have been different if all non-
respondents completed the questionnaire for the study.
CHAPTER II

REVIEW OF THE LITERATURE

This chapter includes a review of the relevant research studies that pertain to the many factors associated with health and fitness program adherence. Specifically, variables such as physical, social-environmental, psychological, demographic, and barriers will be examined to determine their role in the exercise behaviors of individuals at the worksite.

Health Outcomes Related to Exercise

Statistics indicate that the United States is shifting from a country suffering from acute health problems to one suffering from chronic health problems. It is significant that inactivity is associated with several specific chronic health problems plaguing the nation. Fortunately, a growing body of evidence shows that increased levels of physical activity reduce the chances of developing certain chronic diseases, including coronary heart disease (CHD), osteoporosis, and certain cancers (CDC, 1991, p.19). Habitual physical activity has also been shown to extend life. Paffenbarger, Hyde, Wing, and Hsieh (1986) studied Harvard alumni and found that the more active alumni lived longer than the less active alumni by as much as two years.
The effect of exercise on prolonging life is attributed to the preventive and reversing effects exercise has on the development of certain chronic diseases (CDC, 1991).

Several studies have examined the relationship between the incidence of cardiovascular disease and varying levels of physical activity (CDC, 1991, p.19; Paffenbarger & Hyde, 1984). Because CHD is the number one cause of death in the United States, more research into the prevention of the disease is being conducted (CDC, 1985). Paffenbarger and Hyde (1984) found several important conclusions in their study of the relationship between CHD and exercise. For example, a high level of regular exercise is associated with lower incidences of CHD. Also, both leisure time and occupational exercise contribute to reduced risk of CHD. Furthermore, persons that do not participate in regular physical activity have a 40% greater chance of developing CHD than persons who exercise on a regular basis (Paffenbarger & Hyde, 1984).

Regular exercise also contributes to the reduction of certain risk factors associated with CHD. Current research indicates that regular physical activity is associated with reductions in blood pressure, approximately 2-5 mmHg average diastolic pressure (CDC, 1991; Siscovick, LaPorte, & Newman, 1985). This finding is extremely important due to the high prevalence of hypertension in the United States. About 20% of the population has definite hypertension while an
additional 20% is borderline hypertensive (NCHS, 1986).

Physical activity has also been found to be inversely related to the development of osteoporosis (Powell, 1988). People who exercise regularly have higher bone density and fewer incidences of bone fractures (Dalen & Olsson, 1974). Weight-bearing activity has been shown to effect bone density. For instance, walking and running are considered weight-bearing activities, however, swimming may not reduce bone loss (Siscovick et al., 1985).

Siscovick et al. (1985) also found that physical activity reduces blood glucose levels, increases the number of insulin receptors, and increases the effect of insulin in noninsulin-dependent diabetes. Another study by Martin and Dubbert (1985) found similar results. This research suggests that physical activity is a viable alternative for those persons suffering from diabetes mellitus.

A major risk factor for developing Type II (adult onset) diabetes mellitus is obesity (Dietz, 1986; Zakus, 1982). Regular physical activity is linked with greater expenditure of calories, control of appetite, and increased basal metabolism. Therefore, regular physical activity has the potential to decrease the risk of Type II diabetes mellitus.

Much research has linked regular exercise with several other benefits, such as reduced stress, lowered cholesterol levels, improved peripheral vascular disease, reduced risk of certain cancers (colon, breast, and reproductive system
cancers), and reduced lower back pain (CDC, 1991; NCHS, 1986; Powell, 1988). In addition, physical activity has been associated with indirect benefits, as well (Powell, 1988). Some of the benefits include weight control, smoking prevention and cessation, and alcohol and substance abuse (Blair, Jacobs, & Powell, 1985). However, additional research is required in the area of indirect benefits of exercise to establish more evidence in this area (Blair, Jacobs, & Powell, 1985).

Hughes (1984) reviewed several articles on the potential effects of regular exercise on mental health. He found that vigorous exercise has been found to elicit such responses as mood elevation, better self-concept, improved work behavior, and reduced anxiety (CDC, 1991, p.11; Hughes, 1984; Morgan & O'Connor, 1988). All of these factors contribute to an improved quality of life. Still, more research in this area is needed to find definitive conclusions as to the psychological effects of exercise (Morgan & O'Connor, 1988).

Although the overall results of regular exercise are beneficial, many risks are involved (Powell, 1988). The risks can be acute or chronic and may be mechanical, metabolic, or psychological (Powell, 1988). The limited research in this area suggests that some forms of exercise may be more harmful than others for particular types of injuries. For example, running is associated with knee injuries, and the risk of cardiac arrest is higher during
exercise than at rest. However, in the long run, the risk of cardiac arrest is lower for people who exercise on a regular basis verses those who do not (Blair et al., 1985; Powell, 1988). Overall, the benefits of exercise outweigh the potential risks (CDC, 1991, p.25; Powell, 1988).

Trends In Exercise Programs

The number of workers in occupations requiring strenuous physical activity is declining each year (CDC, 1991, p.37). As a result, the U.S. population is moving toward a more sedentary lifestyle. This trend is evidenced by the shift of workers from blue collar to white collar jobs. Normally, blue collar jobs are more physically demanding than white collar jobs.

Since the 1940's, there has been a gradual shift in the U.S. workforce evolving into a more white collar workforce. It was estimated that over 50% of the workers in 1990 were in white collar jobs. This trend is attributed to advancements in technology in labor-saving equipment (CDC, 1991, p.37; USDL, 1980). The shift of the U.S. workforce into more sedentary jobs indicates the need to foster an increase in physical activity during leisure time (CDC, 1991, p.37).

With the rise of a sedentary workforce comes the need to increase participation in corporate health and fitness programs. Approximately 40% of Americans do not exercise during leisure time at all, while an additional 40% of Americans do not reach the recommended levels of exercise for
achieving and maintaining health benefits (Stephens et al., 1985). To increase participation rates, companies need to look at the current trends in physical activity (Shephard, 1988). A recent Canadian Fitness Survey (1983) ranked the most popular activities for exercise. The following activities were ranked according to popularity: walking, cycling, swimming in a pool, jogging or running, gardening, and home exercises (Canada Fitness Survey, 1983). Surprisingly, the typical fitness program exercise class ranked sixteenth in the survey. In addition, several activities showed a growing popularity as a desired form of physical activity. Such activities included cross-country skiing, tennis, golf, and alpine skiing (Canada Fitness Survey, 1983). Corporations need to take these trends into consideration when implementing or expanding their health and fitness programs.

Variables Affecting Exercise Adherence

Companies trying to determine if they are reaching the employees with the greatest health needs must analyze all of the factors that influence exercise adherence of the employee population. Current research indicates that there is a broad spectrum of reasons why people adhere or do not adhere to exercise or health-related behavior (Conrad, 1987; Davis, Jackson, Kronenfeld, & Blair, 1987; Dishman, 1981; Zavela, Davis, Cottrell, & Smith, 1988). The determinants of exercise adherence include variables such as physical
factors, social-environmental factors, psychological factors, and programs factors (Steinhardt & Carrier, 1989). One or many of these factors may influence an individual's decision to exercise on a regular basis (Davis et al., 1988; Welsh, Labbe, & Delaney, 1991).

Physical Variables

Several studies have related overweight, especially high percentage body fat, to low adherence rates (Dishman and Gettman, 1980; Lovato & Green, 1990; Martin & Dubbert, 1985). Dishman and Gettman (1980) proposed that a combination of high percentage body fat coupled with psychological factors, such as negative self-image contribute to the rate of exercise adherence. Using their "psychobiologic" model as a predictor of exercise adherence, Dishman and Gettman correctly identified 80% of dropouts and adherers. In contrast, Gillett (1988) designed a fitness program specifically for overweight women. Gillett found that high adherence rates could be achieved for the overweight population when programs are tailored to the targeted age groups and fitness levels (Gillett, 1988).

As Gillett (1988) found in her study, fitness level is another factor that can influence adherence rates. Most evidence shows that the individuals with higher fitness levels tend to adhere to exercise regimens longer than those with lower fitness levels (Mirotznik, Speedling, Stein, & Bronz, 1985). However, conflicting evidence that adherence
rates are not affected by fitness levels also exists (Zavela, 1988). Mirotznik et al. (1985) surveyed participants of a New York fitness facility and found that participation rates were higher for the individuals with low fitness levels. This was explained by the perceived susceptibility of CHD by individuals with low fitness levels. However, overall adherence rates were higher for the individuals with high fitness levels (Mirotznik et al., 1985). Dishman (1981) found conflicting results from a similar study of biologic variables related to adherence. He found that lighter, leaner, and less fit individuals approached higher adherence rates than those individuals with the opposite characteristics (Dishman, 1981).

Other research links smoking behavior to adherence rates (Conrad, 1987). In one study of the Tenneco Health and Fitness program, the researchers found that participants tended to be nonsmokers (Baum, Bernacki, & Tsai, 1986). This finding is consistent with other findings related to exercise adherence and smoking behavior (Conrad, 1987; Paffenbarger & Hyde, 1988; Zavela et al., 1988).

Other researchers have found the variable of prior physical activity to be a predictive indicator of exercise adherence (Harris, 1978; Zavela, 1988). The evidence suggests that youth participation in sports activities, such as leagues or clubs, can result in adherence to regular exercise as an adult. Dishman and Dunn (1988) speculated
that youth participation in physical activity creates skills and habitual patterns that tend to be followed into adulthood.

Social-Environmental Variables

Sarason, Levine, Basham, & Sarason (1983) divide social support into two types: 1) contributes to positive adjustment and personal development and 2) provides a buffer against the deleterious effects of stress. In their study, they found that increased social support allows an individual to continue at a task even if that task is frustrating (Sarason et al., 1983). Other researchers have conducted studies showing the importance of social support in the adherence to physical activity (Gillett, 1988; Kravitz & Furst, 1991; Sloan & Gruman, 1988). These studies have followed the same patterns as research on medical care compliance. Both studies, medical care compliance and exercise adherence, yielded similar results (Becker & Maiman, 1975; Wankel, 1985). Social factors such as spousal support, employer support, group participation, and peer support are all strong influences on exercise adherence (Gillett, 1988).

Gillett conducted a study of overweight women and their adherence to an exercise dance class. It was concluded that group homogeneity, car pooling, and social networks were all important factors in regular physical activity (Gillett, 1988). A similar study of university students was conducted by Kravitz & Furst (1991). The students that participated in
the aerobic classes with incentives coupled with social support adhered to exercise better than the control group (Kravitz & Furst, 1991). Sloan and Gruman (1988) showed that social support was derived, in part, from the organizational climate at the worksite. They found that control over work tasks and supportiveness from supervisors were greater among participants than nonparticipants (Sloan & Gruman, 1988). In addition, it was found that a poorer work climate was indicative of increased employee stress and decreased overall health satisfaction (Sloan & Gruman, 1988).

Zimmerman and Connor (1989) of significant others yielded similar results on health behavior change. They determined that encouragement, family helpfulness, friends' helpfulness, and coworkers' helpfulness contributed a positive change in exercise adherence (Zimmerman & Connor, 1989). Conversely, Kelly, Zyzanski, & Alemagno (1991) concluded that positive health behavior change was poorly predicted by the level of social support received by the individual. Their findings indicate that other variables such as self-efficacy and health beliefs were more predictive of adherence (Kelly, Zyzanski, & Alemagno, 1991).

Other social-environmental factors contributing to exercise adherence behavior are time and convenience. Wankel (1985) concluded that the dropouts of an employee fitness program more frequently reported that inconvenient time and poor activity selection as their main reasons for
discontinuation of the program. Other reasons given for dropping out of the fitness program included inconvenient location, dislike of rigid schedule, and desire for more recreational activities (Wankel, 1985). An exercise director must take all of these variables into consideration when planning an exercise program targeting low adherers and/or dropouts.

Psychological Variables

Several psychological variables are predictive of exercise adherence. Factors, such as self-motivation, self-efficacy, locus of control, and job satisfaction have all been attributed to the adherence of health-promoting behavior (Dishman, Ickes, & Morgan, 1980; Duda & Tappe, 1988; Steinhardt & Carrier, 1989). Most researchers state that not one specific factor but a combination of factors influence health-related behavior (Duda & Tappe, 1988).

Duda & Tappe (1988) conducted a study of forty-seven adults in a midwestern community participating in an exercise program. They found that the program participants were high in self-efficacy ratings. Consistent with these findings, self-efficacy rated high for participants and low for nonparticipants in several studies (Cline, 1985; Sonstroem, 1988). However, there is conflicting evidence that shows little or no relationship between self-efficacy and exercise adherence (Davis et al., 1987).

Self-motivation factors similarly influence exercise
behavior in individuals. In a study of a six week jogging program, Welsh et al. (1991) found self-motivation to be the leading indicator of adherence to exercise. Dishman, Ickes, & Morgan (1980) found similar results in their study, in fact, self-motivation was found to be the best discriminate factor between adherers and dropouts of an exercise program (Dishman et al., 1980). Importantly, other research indicates that self-motivation coupled with various other reinforcers, such as family participation, rewards, and self-perception is a better predictor of regular physical activity (Atkins et al., 1990; Godin, Shephard, & Colantonio, 1986; Kelly, Zyzanski, & Alemagno, 1991; Noland, 1989; Wankel & Thompson, 1977; Young & Steinhardt, 1991).

The estimation of one's physical ability and the attraction to physical activity are two other factors that have been studied in relation to exercise adherence. Steinhardt and Young (1992) found in their study of participants of Conoco's Health and Fitness Program that attraction was positively associated with participation rates. However, estimation variables showed no relationship to exercise adherence. Sonstroem (1978), in his earlier research, found that both estimation and attraction were good indicators of initial involvement in exercise.

In studies of locus of control, it has been found that internal locus of control is more commonly found among participants than nonparticipants of health and fitness
programs (Duda & Tappe, 1988; Lynch et al., 1992; Pender, Walker, Sechrist, & Frank-Stromborg, 1990). Exercise adherers more commonly take responsibility for their own health status than nonadherers and dropouts. Nonparticipants tended to view their perceived health status was affected by powerful others, chance, or luck (Pender et al., 1990).

Zavela et al. (1988) found that job satisfaction also contributed to health-promoting behavior. In one study of university personnel, poor job satisfaction was associated with increased participation. Dissatisfaction with one's health or current job status might be viewed as an initiative to promote change in the form of exercise involvement (Zavela et al., 1988). Zavela et al. (1988) proposed that exercise may be a constructive way for employees to improve their health and work environment.

Demographic Variables

In Conrad's review of the literature (1987), he found that participants tended to be younger, more educated, female, and nonmanagement individuals. Other studies on exercise adherence yielded similar results pertaining to demographic variables (Pender et al., 1990; Mirotznik et al., 1985; Steinhardt & Carrier, 1989). In part contrary to this evidence, Sloan and Gruman (1988) found in their study of AT&T Communications employees that gender but not age had a significant effect on participation in the program. Furthermore, they found that age had an indirect effect on
participation by influencing risk perceptions of illness; the older the individual, the greater the perceived risk of illness.

Another study by Dishman, Sallis, & Orenstein (1985) found no relationship between exercise adherence and age. Overall, conflicting evidence exists pertaining to exercise adherence in relationship to several demographic variables, such as age, gender, and education level. Baekeland & Lundwall (1975) reviewed treatment compliance literature and found conflicting evidence, as well. They attribute the variation in findings to location and admission policies of the program (Baekeland & Lundwall, 1975). In summary, more convincing research in this area of exercise adherence is needed to establish distinctive patterns of adherers verses nonadherers and dropouts in relationship to demographic variables.

Other Variables

Unfortunately, negative variables also play a substantial part in exercise behavior. These variables include inconvenience, inadequate child care, lack of motivation, lack of knowledge, or limiting health problems. These negative variables may outweigh the positive benefits of regular participation in physical activity. Consequently, this may lead to poor adherence rates and decline in program effectiveness (Franklin, 1988). The health and fitness directors must be aware of these variables when attempting to
promote and sustain participation in their worksite programs.

Green and Kreuter (1991) have identified three categories of factors that affect human behavior. Each category has a different type of influence of behavior. Green and Kreuter (1991) defined the three categories as follows:

* Predisposing factors are those antecedents to behavior that provide the rationale or motivation for the behavior.
* Enabling factors are the antecedents to behavior that enable a motivation to be realized.
* Reinforcing factors are factors subsequent to a behavior that provide the continuing reward or incentive for the behavior and contribute to its persistence or repetition. (p.151)

Their beliefs are that any given behavior can be attributed to a combination of these three types of behavior. Thus, no one factor is the sole source of influence for a particular behavior (Green & Kreuter, 1991). Therefore, any plan to influence behavior, such as exercise adherence, must address all three sets of causal factors (Green & Kreuter, 1991). Green and Kreuter (1991) expect the sequence of events to be as follows:

A person has an initial reason, impulse, or motivation (predisposing factor) to pursue a given course of action. The motivation is followed by deployment or use of resources to enable the action (enabling factor). This usually results in the behavior, followed by a
relation to the behavior which is emotional, physical, or social (reinforcing factor). Reinforcement strengthens behavior, future resources, and motivation. (p. 152)

Steinhardt and Dishman (1989) followed this line of reasoning in their study of expected outcomes and barriers to exercise adherence of college students. They found several barriers that influence regular physical activity. Some of these barriers include: lack of time, lack of motivation, too lazy, too tired, too fatigued by exercise, too inconvenient, bad weather, lack of facilities, boredom, and limiting health reasons (Steinhardt & Dishman, 1989).

Franklin (1988) in his studies found exercise adherence to be similar to other health-related behaviors in terms of barriers that influence adherence. He found additional factors that influence exercise behavior other than those found by Steinhardt and Dishman. Franklin noted the additional following factors: lack of exercise variety, excessive cost, poor exercise leadership, high intensity exercise, and inflexible exercise goals (Franklin, 1988). Franklin goes on to state that health education and motivational strategies are necessary to improve exercise adherence rates and the quality of health and fitness programming (Franklin, 1988).

Overall, factors shaping exercise behavior are quite complex. Health practitioners must understand the various
factors and the complex relationship they have on health behavior. Shephard (1988) summarizes the effects of predisposing, enabling, and reinforcing variables by stating: 

There is probably a whole series of predisposing factors such as knowledge, attitudes, beliefs, values, and perceptions which create an intention of involvement in physical activity. A series of enabling factors that encourages the translation of intentions into action; key variables are the individual's repertory of activity skills as well as personal and corporate resources. Finally, a series of reinforcing factors ensures persistence of the behavior. (p. 315) 

Several researchers have attempted to understand exercise participation behavior by applying different psychological models to individual health behavior. The difficult challenge of understanding who exercises and who does not has led to the development of psychological models to predict exercise adherence (Sonstroem, 1988). Sallis and Hovell (1990) state that conducting exercise determinants research is very challenging due to the "natural history of exercise." They explain that exercise adherence is influenced, in part, by four phases of exercise: adoption, maintenance, drop-out, and resumption. They go on to state that current research tends to focus on only a portion of the natural history of exercise, and that researchers can broaden their scope by applying the model of the natural history of
exercise behavior (Sallis & Hovell, 1990). The specific determinants related to exercise adherence may be different at each phase in the natural history of exercise, therefore, answering the question of why people exercise is very difficult and complex (Sallis & Hovell, 1990).

Dishman and Gettman (1980) proposed a psychobiologic model for predicting exercise adherence. They identified percent body fat, body weight, and self-motivation as predictor variables. In their studies, they successfully predicted 88% of the adherers but failed to predict dropouts. With further study, the authors concluded that different factors affect adherence over time and adherence patterns vary between the sexes (Dishman & Gettman, 1980; Sonstroem, 1988). In another study of the worksite wellness program of Conoco, Young and Steinhardt found the psychobiological model failed to predict supervised worksite exercise (Young & Steinhardt, 1991). They concluded that complex behavior patterns associated with exercise adherence can not be predicted using only a few predictor variables (Young & Steinhardt, 1991).

The Health Belief Model (HBM) is another psychological model used to predict health behavior. The HBM evolved from research dealing with why people failed to utilize screening tests for early detection of disease (Sonstroem, 1988). The model contains four basic components. The first component, susceptibility, refers to an individual's perception of the
likelihood of contracting a particular disease. The second component, severity, refers to the extent that the individual perceives the health threat to be serious. The two additional components of this model are the perceived benefits of and the perceived barriers to taking particular actions. The latter component includes such aspects as the inconvenience, cost, and unpleasantness of a specific course of action (Sonstroem, 1988). In applying this model to the problem of adherence, adhering to an aerobic exercise regimen would depend upon (a) one's subjective beliefs about health, particularly one's susceptibility to CHD or other illness (b) one's beliefs about the severity of the consequences of not adhering to an exercise regimen (c) one's beliefs about the value of regular physical activity and its potential benefits, and (d) one's perceptions of the barriers to exercising regularly (Lyons, 1985).

The limited research in applying this model to the prediction of exercise has shown conflicting results. Overall, the HBM is useful in examining sick-role behaviors, however, this model does not include the numerous motivations for exercise adherence (Sonstroem, 1988). The HBM was derived to examine specific health behaviors, whereas, exercise adherence incorporates a variety of behaviors over time (Sonstroem, 1988).

Other models such as the Locus of Control, Self-Efficacy, Theory of Reasoned Action, and Self-Motivation
Model have all been used to assess or predict exercise adherence (Sonstroem, 1988). However, research in this area has not provided a superior model for the study of exercise participation. All of the models contain important elements, however, none of them are comprehensive enough to provide a methodology for changing the complex nature of exercise behavior (Sonstroem, 1988).

Current evidence indicates that a variety of factors influence exercise participation, and psychological models are not a reliable source for predicting exercise adherence. Furthermore, the factors vary from one geographic location to another. Yet, it is important to assess the specific factors influencing participation rates of particular health and fitness programs in order to establish methods and strategies for behavior intervention and fitness programming (Dishman, 1988). Once the specific factors that can be modified are identified, then motivational, marketing, and program changes can be instituted to target improved exercise adherence rates (Franklin, 1988). Surveys of entire corporations, current exercise class participants, and dropouts are all helpful in establishing the type of activity employees want, the rewards they are seeking from physical activity, and the influence of personal characteristics upon such needs (Franklin, 1988).
CHAPTER III

RESEARCH METHODOLOGY

Description of Texas Instruments Health and Fitness Program

The Texas Instruments Health and Fitness Program, called the Texins Association, has a membership of approximately 1,500 employees, composed of both blue and white collar individuals. The monthly fee for membership in the Texins Association averages ten dollars for employees and fourteen dollars for families. There are a wide variety of activities offered at the Texins Association ranging from general sports and hobbies to social and cultural functions. The facility is open seven days a week with operating hours extending from 8 a.m. to 10 p.m.

The Texins Association's recreational and fitness activities are conducted on the eight-acre site of Texas Instruments Incorporated in Dallas, Texas. The Activities Center includes a gymnasium, billiard room, aerobics room, game room, meeting rooms, club rooms, snack area, and administrative offices. Outside facilities include lighted tennis courts, softball fields, a one-fourth mile rubberized track, a 2.6 mile jogging track, and a multi-station exercise course. The Fitness Center includes Nautilus and Cybex
equipment, free weight equipment, Hydra Fitness Pneumatic Resistance equipment, Schwinn Airdyne and Monark Bikes, treadmills, a rowing machine, and Stairmasters.

Members of the Texins Association's P.A.T.H. (Positive Approach to Total Health) program and aerobics classes compose a large portion of the sample subjects. The P.A.T.H. program is an adult fitness program designed to familiarize T.I. employees with the aspects of total health, including diet and nutrition, weight control, stress management, and personal exercise. The P.A.T.H. program targets individuals who are thirty-five years old or older and have two or more risk factors for cardiovascular disease, such as high cholesterol, overweight, high blood pressure, or family history of heart disease.

The aerobic exercise classes range from beginner to advanced levels. The aerobics classes include various formats, such as low impact, muscle conditioning, circuit training, high impact, bench, and water aerobics. In addition, special population aerobics classes are available for expectant mothers, employees over the age of fifty, and employees with back problems.

The Texins facility also offers health education classes and other fitness-related services. These health classes include smoking cessation, weight loss, and nutrition classes. Other services and products provided by the Texins facility include complete fitness profiles, hydrostatic
weighing, and blood chemistry analysis. Lastly, the Texins Association offers an incentive program for participation in all fitness-related activities. The incentive program is designed so that prizes are awarded to members who log their fitness activities in the computer at the fitness facility. Those members who show improvement or demonstrate consistent healthy behavior are given prizes on a quarterly basis.

Selection of Subjects

The sample for this study was comprised of employees at Texas Instruments Incorporated (TI) in Dallas, Texas. The subjects were selected based upon a stratified random sample. The stratification of the sample was based on approximately equal numbers of males and females, and was selected from two different subpopulations at TI so that the full range of exercise participation would be represented by the subjects. The two subpopulations consisted of the Texins current membership enrollment and the total employee population at TI in Dallas (excluding those employees who are members of Texins). The sample of adherers to exercise (N=300) were selected from a list of the 1,500 current members of the Texins Association. The dropout and nonparticipant sample (N=600) was randomly selected from the Dallas area TI employee population consisting of 20,000 employees who were not currently members of the Texins Association.

After the subjects completed the questionnaires, they were then divided into four comparison groups based upon
their responses to two questions pertaining to their current involvement in the Texins facility and exercise frequency (see questions 5a and 5c in Appendix B). The four groups were operationally defined as follows: high adherers—those participants who attended the Texins facility an average of three or more times per week; low adherers—subjects whose attendance at the Texins facility averaged less than three times per week; dropouts—those subjects who attended at least once but do not currently participate in the Texins program; and nonparticipants—subjects who have never attended the Texins Health and Fitness program. Self-reported attendance data was used to determine membership in these groups. All data was collected on a voluntary basis and in a manner that protected the anonymity of subjects.

Instrumentation

A questionnaire to assess exercise-related behavior was used to collect the data. The questionnaire consisted of 67 items, thirty of which were taken from a scale developed by Steinhardt and Carrier (1989); eleven out of thirty-four were taken from a scale developed by Steinhardt and Dishman (1989); and twenty-six questions were developed by the author. Permission was granted by Steinhardt to use the previously established scales for use in this study. The questionnaire was divided into five sections: demographic information; self-motivation (SMS); attitudinal commitment (ACS); predisposing, reinforcing, and enabling (PERS) factors
The content validity of the questionnaire was established using a panel of five experts in the field of worksite health and fitness programs. These experts were all members of the Association for Worksite Health Promotion (Appendix C). Using a five-point Likert scale, each expert was asked to review the items on the survey and judge the content validity of each item to measure exercise adherence. Furthermore, the experts were encouraged to write subjective comments on each item.

An average of three on the five-point Likert scale was used as the acceptance criteria for each item. All items that were rated by the panel with an average of three or less on a scale from (1) Very Unacceptable to (5) Very Acceptable were deleted from the questionnaire. Once the evaluations from the panel of experts were reviewed, specific changes were made to the questionnaire based upon the experts' input. Two items were deleted and an item was added to the barriers scale. The suggestions and comments of the experts were incorporated into the questionnaire to clarify the meaning of the items, where appropriate.

A pilot study at Blue Cross/Blue Shield of Texas (BCBS) was conducted to establish the reliability of the two scales: the scale measuring the predisposing, enabling, and reinforcing factors (PRE scale), and the barriers scale measuring the effort, time, physical ability, inconvenience,
and obstacles associated with exercise adherence. This worksite was chosen because it was comprised of a similar population of employees to those found at Texas Instruments, Inc.

The pilot study sample consisted of fourteen employees at Blue Cross Blue Shield of Texas. The participants represented the full range of participation in physical activity from high adherer to nonparticipant. Confidentiality was assured by informing the employees that the results of the questionnaire would be reported as group scores only. In addition, the subjects were identified only by the last four digits of their social security numbers and the last four digits of their telephone numbers. This prevented the subjects identity from being established but allowed the researcher to match the test-retest results of each subject. The employees were also informed that the study was voluntary and they could stop participating at any time. A second administration of the questionnaire was given after eleven days of the first administration. Using the test-retest design, the Pearson Product Moment Coefficient of Correlation was used to establish the reliability of the PRE scale (.81) and barriers (.93) scale.

Demographic Information Section (k=8)

This section was comprised of eight questions relating to basic demographic information. Included in this section were items related to gender, marital status, age, smoking
preference, and exercise participation. The questions in this section were used to divide the subjects into the four comparison groups: high adherers, low adherers, dropouts, and nonparticipants.

**Self-Motivation Section (SMS) (k=20)**

The variable of self-motivation was measured using a shortened version of the Self-Motivation Inventory. The self-motivation scale (SMS) consisted of twenty items that Steinhardt and Carrier (1989) selected from the original scale using a random numbers table. In their study, the scale had an internal consistency of .85 which was similar to that of .91 reported by Dishman and Ickes (1981).

**Attitudinal Commitment Section (ACS) (k=7)**

A scale developed by Steinhardt and Carrier (1989) based on a five-point Likert scale was used to measure attitudinal commitment to exercise. The reliability coefficient for the seven scaled items as reported by Steinhardt and Carrier (1989) was .73 across sexes.

**Predisposing, Reinforcing, and Enabling Factors Section (PERS) (k=16)**

Sixteen questionnaire items were used to measure the predisposing, reinforcing, and enabling factors related to regular exercise. The items were rated on a five-point Likert scale ranging from not at all important (1) to extremely important (5). Three of the sixteen scaled items measure social support and were taken from Steinhardt and
Carrier (1989). These questions measured support from a spouse or close friend, supervisor, and coworkers. Steinhardt and Carrier (1989) report an internal consistency coefficient of .77 for these items. The remaining thirteen items were developed by the author after the review of the literature related to predisposing, reinforcing, and enabling factors associated with exercise adherence. All sixteen items were subjected to a pilot test using a sample from Blue Cross Blue Shield of Texas. The test-retest reliability coefficient established from the pilot was .81.

The items on the scale were broken down into predisposing, enabling, and reinforcing subscales. The questionnaire included four predisposing factors, four enabling factors, and eight reinforcing factors.

**Barriers Section (BRES) (k=15)**

This scale measured specific barriers related to exercise adherence. Eleven of the fifteen items were taken from a scale developed by Steinhardt and Dishman (1989) and modified for this specific population. The remaining three items of the barriers scale were developed by the author after review of the literature.

The barriers scale was divided into five subscales: effort (k=3), time (k=3), physical ability (k=3), inconvenience (k=2), and obstacles (k=4). All fifteen scaled items were subjected to a pilot study using a sample from Blue Cross Blue Shield of Texas. Using the test-retest
design, a reliability coefficient of .93 was established for the barriers scale.

In summary, the questionnaire consisted of five sections containing 66 items. Items were taken from a scale developed by Steinhardt and Carrier (1989), a scale developed by Steinhardt and Dishman (1989), and items developed by the author. The content validity and reliability for all items were established by Steinhardt and Carrier (1989), Steinhardt and Dishman (1989), the panel of experts, and the pilot study.

Procedure

The subjects of the sample were sent a packet of materials through the inter-office mail system at Texas Instruments, Inc. The packet included an introductory cover letter (Appendix A), a questionnaire (Appendix B), and a return envelope. The introductory cover letter explained the purpose of the study and the necessary instructions for completion of the questionnaire. In addition, the cover letter emphasized that the study was strictly voluntary and the respondents would be kept confidential.

The packets were mailed to the subjects, and each subject was asked to respond as quickly as possible. The subjects were asked to return their completed questionnaires through inter-office mail in the enclosed envelope to Steve Fischer, the Texins Association director. After two weeks, a follow-up letter was sent to the nonrespondents indicating
that their completed questionnaires had not yet been received and their responses were important for the completion of the study. This allowed for two full weeks for data collection for those subjects who might have been absent one week for health, vacation, or work reasons. A second follow-up letter was sent after four weeks of the initial mail-out to all of the nonrespondents. Included with the second follow-up letter was another copy of the questionnaire. All data collection terminated six weeks after the initial mail-out of the questionnaires.

Statistical Treatment of Data

The data derived from the five-point Likert scaled questions was used to assess the importance of several factors in relationship to exercise adherence. The questionnaire contained several scales to measure different aspects of exercise adherence. The four scales that were used were self-motivation scale (SMS); attitudinal commitment scale (ACS); predisposing, enabling, and reinforcing factors scale (PERS); and barriers related to exercise scale (BRES). A significance level of $p > .0100$ was used for this study. The overall mean and standard deviation scores for these scales were analyzed to distinguish in similarities and/or differences among comparison groups, as well.

A further breakdown by subscale demonstrated differences among the comparison groups that the overall scale scores did
The PERS was broken down into three subscales: predisposing, reinforcing, and enabling factors. In addition, the BRES was broken down into five subscales: time, effort, physical ability, inconvenience, and obstacles. The SMS and ACS did not have subscales.

Further breakdown of the means and standard deviations among the groups was needed to determine differences among the high adherers, low adherers, dropouts, and nonparticipants. In addition, a one-way Analysis of Variance (ANOVA) test was used to distinguish any significant differences among the high adherers, low adherers, dropouts, and nonparticipants on the self-motivation scale and the attitudinal commitment scale. A significance level of \( p > 0.0100 \) was used for each of the four scales in this study for an overall significance level of \( p > 0.0500 \).

A one-way ANOVA's was used to determine any differences among the high adherers, low adherers, dropouts, and nonparticipants in relationship to the predisposing, reinforcing, and enabling factors associated with exercise (PERS). The one-way ANOVA was used for each of the three subscales: predisposing, enabling, and reinforcing subscales.

In addition, a one-way ANOVA was used to determine any differences among the comparison groups in relationship to the perceived barriers associated with exercise adherence. The BRES was divided into five subscales for comparison and
the ANOVA was calculated for each subscale.

A post hoc comparison test was made to determine the differences among comparison groups when a significant F ratio was found during the one-way ANOVA calculations for each of the scales and subscales.
CHAPTER IV

RESULTS

This chapter will examine and report the four research hypotheses presented in Chapter I. As previously stated, approximately 900 subjects comprised the sample. The selection consisted of 300 members of the Texins exercise facility and 600 non-members. The initial mailing and two follow-up mailings to 900 subjects produced 431 completed questionnaires, yielding a 47.8% response rate.

Comparison Group Classification

The subjects were divided into six comparison groups based upon their responses to two questions pertaining to their current exercise pattern and involvement in the Texins facility (see questions 5a and 5c in Appendix B). Those respondents who answered that they exercise at the Texins facility were then asked about the frequency of their participation. Based upon the subjects' responses to this question (question 5c in Appendix B), they were classified as either high or low adherers. A high adherer is operationally defined as one who attended the Texins facility an average of three or more times per week, whereas a low adherer was one who attended the Texins facility an average of less than three times per week.
Subjects who indicated in their response to questions 5 and 5a that they have dropped out of the Texins program and do not exercise were categorized into the dropout A group. Subjects who indicated that they have dropped out of the Texins program and exercise at home or another facility were classified as the dropout B group. Those who have never attended the Texins Health and Fitness program and do not currently exercise were categorized as the nonparticipant A group, and the nonparticipant B group was comprised of subjects who have never attended the Texins Health and Fitness program and currently exercise at home or another facility. Table 1 details the breakdown of the groups based on the answers to questions 5, 5a and 5c.

Demographics

Several demographic characteristics were measured for each respondent. The characteristics that were measured included gender, age, smoking status, marital status, and current participation in physical activity. The sample consisted of 323 males and 108 females. In addition, of the 431 respondents, 40 were smokers and 387 were non-smokers. Further breakdown of the sample based on the responses to the demographic information are detailed in Tables 2-4. Tables 2 and 3 detail the breakdown of the sample based on age and marital status, respectively.
Table 1

**Comparison Group Classification Based on Responses to Questions 5, 5a and 5c**

<table>
<thead>
<tr>
<th>Comparison Group</th>
<th>Number of Respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Adherer</td>
<td>51</td>
<td>12.1</td>
</tr>
<tr>
<td>Low Adherer</td>
<td>56</td>
<td>13.3</td>
</tr>
<tr>
<td>Dropout A*</td>
<td>35</td>
<td>8.3</td>
</tr>
<tr>
<td>Dropout B**</td>
<td>88</td>
<td>20.9</td>
</tr>
<tr>
<td>Nonparticipant A***</td>
<td>67</td>
<td>15.9</td>
</tr>
<tr>
<td>Nonparticipant B****</td>
<td>124</td>
<td>29.5</td>
</tr>
</tbody>
</table>

*  Subjects who have dropped out of Texins and do not exercise

**  Subjects who have dropped out of Texins but exercise at home or another facility

***  Subjects who have not participated in Texins and do not exercise

****Subjects who have not participated in Texins but exercise at home or another facility
Table 2

Age Distribution of the Sample

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of Respondents</th>
<th>Percent of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>10</td>
<td>2.3</td>
</tr>
<tr>
<td>26-35</td>
<td>101</td>
<td>23.4</td>
</tr>
<tr>
<td>36-45</td>
<td>111</td>
<td>25.8</td>
</tr>
<tr>
<td>46-55</td>
<td>154</td>
<td>35.7</td>
</tr>
<tr>
<td>56+</td>
<td>55</td>
<td>12.8</td>
</tr>
</tbody>
</table>

As Table 2 shows, the distribution of the sample based on age is fairly consistent across ages. Table 3 shows that the majority (74%) of the respondents are married.

Table 3

Distribution of Sample Based on Marital Status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Single</th>
<th>Married</th>
<th>Divorced</th>
<th>Separated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>66</td>
<td>320</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>Percent of Sample</td>
<td>15.3</td>
<td>74.2</td>
<td>7.2</td>
<td>2.6</td>
</tr>
</tbody>
</table>
Table 4 reports on the respondents' pattern of exercise. Over half of the sample chose to exercise at home, whereas a third exercise at the Texins facility. More than a fifth of the sample (22%) reported not exercising at all. Some of the respondents (19%) reported that they exercise both at the Texins facility and at home. In addition, approximately 16% of the sample chose to exercise at another fitness facility.

Table 4

Distribution of Sample Based on Where Subjects Choose To Exercise

<table>
<thead>
<tr>
<th>Where Subject Exercises</th>
<th>Don't Exercise</th>
<th>Home</th>
<th>Texins Facility</th>
<th>Other Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>95</td>
<td>234</td>
<td>159</td>
<td>68</td>
</tr>
<tr>
<td>Percent of Sample</td>
<td>22</td>
<td>54.3</td>
<td>36.9</td>
<td>15.8</td>
</tr>
</tbody>
</table>

Table 5 shows the length of participation of those who currently exercise at the Texins facility. Over twenty percent of the subjects have been exercising at the Texins
Health and Fitness facility for over two years. In addition, the responses to questions 5b and 5c on the questionnaire were analyzed for the low and high adherer groups.

In summary, the subjects tend to be married (74%), male (75%), between the ages of 36-55 (62), and non-smokers (90%). In addition, the majority of the sample exercise at home (54%) or at Texins (37%), however, several do not exercise at all (22%). Of those who exercise at Texins, the most have been members over two years (20.6).

Table 5

Distribution of Sample Based on Length of Participation

<table>
<thead>
<tr>
<th>Length of Participation</th>
<th>Number of Responses</th>
<th>Percent of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 months</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>3-6 months</td>
<td>4</td>
<td>.9</td>
</tr>
<tr>
<td>&gt; 6 months but &lt; 1 year</td>
<td>15</td>
<td>3.5</td>
</tr>
<tr>
<td>1-2 years</td>
<td>14</td>
<td>3.2</td>
</tr>
<tr>
<td>2+ years</td>
<td>89</td>
<td>20.6</td>
</tr>
</tbody>
</table>
Hypothesis #1

"There is a significant difference in the level of self-motivation among high adherers, low adherers, dropouts, and nonparticipants of an exercise program."

Table 6 shows the mean scores and standard deviation scores for the comparison groups. The possible range of scores for each of the scales was: SMS 20-100, ACS 7-35, PERS 16-80, and BRES 15-75. The high adherers showed the highest level of self-motivation (m=78.12), however, the low adherers and nonparticipants who exercise at home or another facility (group B) demonstrated similar levels of self-motivation (m=77.9 and m=77.00, respectively). The dropouts who do not exercise (group A) showed the lowest level of self-motivation of all six comparison groups.

A one-way ANOVA was used to analyze the responses to the twenty-item self-motivation scale (SMS), and the results of this analysis can be found in Table 7. In addition, a post hoc comparison test was conducted to distinguish the differences among the six comparison groups. It was found that the significant differences were between the low adherers and the dropouts who do not exercise (group A); the high adherers and the dropouts who do not exercise (group A); and the nonparticipants who exercise at home or another facility (group B) and the dropouts who exercise (group A). The differences among the groups were significant at the p<.01 level. This finding indicates that the dropouts' lack
### Table 6

**Mean and Standard Deviation Scores by Comparison Group**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Range of Scores</th>
<th>High Adherer Mean</th>
<th>St.D</th>
<th>Low Adherer Mean</th>
<th>St.D</th>
<th>Dropout A* Mean</th>
<th>St.D</th>
<th>Dropout B** Mean</th>
<th>St.D</th>
<th>Nonpart. A*** Mean</th>
<th>St.D</th>
<th>Nonpart. B**** Mean</th>
<th>St.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>20-100</td>
<td>78.12</td>
<td>8.34</td>
<td>77.90</td>
<td>9.27</td>
<td>71.29</td>
<td>9.70</td>
<td>74.85</td>
<td>9.17</td>
<td>74.79</td>
<td>9.46</td>
<td>77.01</td>
<td>9.31</td>
</tr>
<tr>
<td>ACS</td>
<td>7-35</td>
<td>20.81</td>
<td>2.45</td>
<td>21.76</td>
<td>3.14</td>
<td>21.83</td>
<td>3.29</td>
<td>21.50</td>
<td>3.16</td>
<td>20.45</td>
<td>3.01</td>
<td>21.00</td>
<td>3.23</td>
</tr>
<tr>
<td>PERS:</td>
<td>16-60</td>
<td>54.93</td>
<td>9.82</td>
<td>56.53</td>
<td>9.46</td>
<td>55.80</td>
<td>9.67</td>
<td>57.26</td>
<td>9.13</td>
<td>52.03</td>
<td>11.58</td>
<td>53.24</td>
<td>10.72</td>
</tr>
<tr>
<td>Predisp.</td>
<td>4-20</td>
<td>15.96</td>
<td>2.48</td>
<td>15.78</td>
<td>2.54</td>
<td>14.43</td>
<td>2.44</td>
<td>15.46</td>
<td>2.72</td>
<td>13.80</td>
<td>3.25</td>
<td>14.79</td>
<td>2.58</td>
</tr>
<tr>
<td>Enabling</td>
<td>4-20</td>
<td>11.69</td>
<td>3.19</td>
<td>12.88</td>
<td>3.47</td>
<td>12.63</td>
<td>3.87</td>
<td>13.30</td>
<td>3.79</td>
<td>12.40</td>
<td>3.59</td>
<td>12.01</td>
<td>3.84</td>
</tr>
<tr>
<td>Reinforc.</td>
<td>8-40</td>
<td>27.27</td>
<td>5.88</td>
<td>28.10</td>
<td>6.01</td>
<td>28.74</td>
<td>5.96</td>
<td>28.57</td>
<td>5.31</td>
<td>25.83</td>
<td>6.35</td>
<td>26.73</td>
<td>6.55</td>
</tr>
<tr>
<td>BRES:</td>
<td>15-75</td>
<td>30.27</td>
<td>7.09</td>
<td>34.10</td>
<td>6.57</td>
<td>39.73</td>
<td>5.53</td>
<td>37.75</td>
<td>7.25</td>
<td>39.60</td>
<td>7.20</td>
<td>37.87</td>
<td>7.81</td>
</tr>
<tr>
<td>Time</td>
<td>3-15</td>
<td>10.21</td>
<td>3.06</td>
<td>10.47</td>
<td>2.98</td>
<td>11.21</td>
<td>2.25</td>
<td>10.98</td>
<td>3.00</td>
<td>11.04</td>
<td>2.65</td>
<td>10.48</td>
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<tr>
<td>Effort</td>
<td>3-15</td>
<td>5.07</td>
<td>2.08</td>
<td>6.53</td>
<td>2.82</td>
<td>9.17</td>
<td>2.94</td>
<td>7.66</td>
<td>2.92</td>
<td>8.30</td>
<td>2.93</td>
<td>7.21</td>
<td>2.77</td>
</tr>
<tr>
<td>Phys.Ab.</td>
<td>3-15</td>
<td>5.13</td>
<td>2.40</td>
<td>4.51</td>
<td>2.12</td>
<td>4.46</td>
<td>1.52</td>
<td>4.53</td>
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<td>2.19</td>
<td>4.52</td>
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<td>Inconv.</td>
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<td>1.41</td>
<td>3.96</td>
<td>1.85</td>
<td>5.03</td>
<td>2.26</td>
<td>4.93</td>
<td>2.43</td>
<td>5.09</td>
<td>2.18</td>
<td>5.52</td>
<td>2.38</td>
</tr>
<tr>
<td>Oth.Obs.</td>
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<td>6.95</td>
<td>2.55</td>
<td>8.63</td>
<td>2.82</td>
<td>10.09</td>
<td>2.66</td>
<td>9.66</td>
<td>3.19</td>
<td>10.68</td>
<td>2.76</td>
<td>10.25</td>
<td>3.01</td>
</tr>
</tbody>
</table>

* Those subjects who have dropped out of Texins and do not exercise
** Those subjects who have dropped out of Texins and exercise at home or another facility
*** Those subjects who have not participated at Texins and do not exercise
**** Those subjects who have not participated at Texins and exercise at home or another facility
of exercise adherence is related to their perceived lower levels of self-motivation. Conversely, the low and high adherer groups indicated higher levels of self-motivation which could be attributed to their higher level of exercise adherence. In summary, hypothesis #1 is accepted based on the significant differences found between low adherers and dropouts (group A), and between high adherers and dropouts (group A).

The SMS results compared to those results found by Steinhardt and Carrier (1981) yielded different results. They found the average score for the non-adherers to be 76.45 (standard deviation = 11.86). For the adherers, Steinhardt and Carrier (1981) found the average mean score to be 77.25 with a standard deviation score of 11.97. This score was different than this study which yielded the high and low adherer average mean score of 78.02.

Hypothesis #2

"There is a significant difference in the level of attitudinal commitment among high adherers, low adherers, dropouts, and nonparticipants of an exercise program."

A one-way ANOVA analysis in Table 7 reported no significant difference among the six comparison groups at the p<.01 significance level based on responses to the attitudinal commitment scale (ACS). The finding indicates
that attitudinal commitment to physical activity is not closely linked with the level of exercise adherence for this sample. Therefore, hypothesis #2 is rejected.

Table 7

One-Way ANOVA Analysis Among High Adherers, Low Adherers, Dropouts, and Nonparticipants

<table>
<thead>
<tr>
<th>Scale</th>
<th>F Ratio</th>
<th>F Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS</td>
<td>3.56</td>
<td>.0038*</td>
</tr>
<tr>
<td>ACS</td>
<td>1.79</td>
<td>.1139</td>
</tr>
<tr>
<td>PERS:</td>
<td>2.88</td>
<td>.0144</td>
</tr>
<tr>
<td>Predisposing</td>
<td>5.77</td>
<td>.0000*</td>
</tr>
<tr>
<td>Enabling</td>
<td>1.92</td>
<td>.0906</td>
</tr>
<tr>
<td>Reinforcing</td>
<td>2.30</td>
<td>.0445</td>
</tr>
<tr>
<td>BRES:</td>
<td>14.36</td>
<td>.0000*</td>
</tr>
<tr>
<td>Time</td>
<td>1.10</td>
<td>.3574</td>
</tr>
<tr>
<td>Effort</td>
<td>13.16</td>
<td>.0000*</td>
</tr>
<tr>
<td>Phys. Ability</td>
<td>.85</td>
<td>.5126</td>
</tr>
<tr>
<td>Inconvenience</td>
<td>11.28</td>
<td>.0000*</td>
</tr>
<tr>
<td>Other Obstacles</td>
<td>13.62</td>
<td>.0000*</td>
</tr>
</tbody>
</table>

* Indicates results of scale are significant at p<.0100
This finding was different than that found by Steinhardt and Carrier (1981) in which the ACS yielded a mean score of 24.68 for non-adherers and 26.71 for adherers. This study found the ACS mean score to be much lower for the high and low adherers (m=21.26).

Hypothesis #3

"There is a significant difference in the predisposing, reinforcing, and enabling factors influencing behaviors related to exercise among high adherers, low adherers, dropouts, and nonparticipants of an exercise program."

The results based on the sixteen-item PERS do not indicate a level of significance (F probability =.0144) among the six comparison groups. Tables 6 and 7 display the breakdown of the results for each group and the results of the one-way ANOVA analysis. The breakdown of the PERS scale into the three subscales (predisposing, enabling and reinforcing) indicate significance for the predisposing scale only.

Predisposing Subscale

Further analysis of the subscales of the predisposing, enabling, and reinforcing scale (PERS) demonstrate different findings from the overall scale. The results of the one-way ANOVA analysis of the predisposing subscale, as summarized in Table 7, show a high level of significance (p<.01). This finding indicates a higher level of significance (F probability=.00) for the predisposing subscale as compared to
the overall PERS (F probability=.00). In this subscale, the
groups that show a significant difference are between the low
adherer and the nonparticipants who do not exercise (group
A); the high adherer and nonparticipants who do not exercise
(group A); and the dropouts who exercise at home or another
facility (group B) and nonparticipants who do not exercise
(group A) based on the post hoc comparison test. In
addition, the overall range of the mean scores between all
groups is m=13.80 to m=15.96 (see Table 6).

**Enabling Subscale**

The one-way ANOVA analysis of the enabling subscale did
not reveal significance at the p<.01 level (see Table 7).
The post hoc analysis did not reveal that any two groups were
significantly different than the other groups.

**Reinforcing Subscale**

The mean scores and standard deviation scores for the
reinforcing subscale can be found in Table 6. The one-way
ANOVA analysis results did not show a significant level at
the p<.01 level (see Table 7).

Overall, the subscales indicate that only the
predisposing subscale may influence the exercise behaviors of
the individuals in the study. The enabling and reinforcing
subscales are consistent with the overall PERS scale showing
no significance. Based on the analysis, hypothesis #3 is
rejected at the p<.01 significance level.
Hypothesis #4

"There is a significant difference in the perceived barriers related to exercise adherence among high adherers, low adherers, dropouts, and nonparticipants of an exercise program."

The responses to the fifteen-item overall barriers related to exercise scale (BRES) were analyzed using a one-way ANOVA analysis. As seen in Table 7, there is a high level of significance among the six comparison groups (F ratio=14.3593, F probability=.00, p<.01). In addition, the mean scores ranged from m=30.27 to m=39.60. Table 6 shows the mean scores and standard deviation scores of the comparison groups. A post hoc analysis found significant differences among several of the comparison groups at the p<.01 significance level. Significant differences were found between the high adherers and both dropout groups (A and B), high adherers and both nonparticipant groups (A and B), low adherers and both nonparticipant groups (A and B), and low adherers and the dropouts who do not exercise (group A).

The findings reinforce the theory that perceived barriers can negatively impact exercise frequency. For example, the nonparticipants and dropouts that do not exercise at all (dropout A and nonparticipant A) have the highest level of perceived barriers as compared to the other groups. In summary, hypothesis #4 is accepted at the p<.01 significance level.
For the purposes of this study, the BRES was broken down into five subscales: time, effort, physical ability, inconvenience, and other obstacles. The responses to each of the five subscales were then analyzed using a one-way ANOVA to determine differences in the results from those reported in the overall barriers scale.

**Time Subscale**

The one-way ANOVA analysis of the three-item time subscale showed no significant differences among the comparison groups at the $p<.01$ level ($F$ ratio=$1.10$, $F$ probability=$.36$). Table 6 details the mean scores and standard deviation scores of the responses for this subscale.

**Effort Subscale**

The three-item effort subscale relate to motivation, laziness, and fatigue. This subscale demonstrated a significance at the $p<.01$ level ($F$ ratio=$13.16$, $F$ probability=$.00$). Table 6 shows the mean scores and the standard deviation scores for this subscale by comparison group. The mean scores were lower than the overall barriers scale, thereby indicating that effort as a barrier to exercise adherence is not as important as some of the other barriers. In addition, Table 6 shows the wide range of mean scores, $m=9.17$ to $m=5.07$. The scores were based on a five point Likert scale where "1" is strongly disagree and "5" is strongly agree with the statements with the possible overall scale range of 3 to 15.
Using a post hoc comparison analysis, several groups were found to be significantly different from the others at the p<.01 level for the effort subscale. The seven significantly different groups are as follows: high adherers and both dropout groups (A and B), high adherers and both nonparticipant groups (A and B), low adherers and the nonparticipants who do not exercise (group A), low adherers and the dropouts who do not exercise (group A), and nonparticipants who exercise at home or another facility (group B) and dropouts who do not exercise (group A). The low adherers (m=5.07) demonstrated the lowest score for the perceived barrier of effort.

Physical Ability Subscale

The one-way ANOVA analysis of the three-item physical ability subscale showed no significance at the p<.01 level (F ratio=.85, F probability = .51). Table 6 shows the means score and standard deviation scores for the subscale.

Inconvenience Subscale

The analysis of the two-item inconvenience subscale yielded interesting results. The mean scores showed a broad range from m=3.10 for the high adherers to m=5.52 for the nonparticipant B group (see Table 6). These scores indicate that inconvenience is more of a barrier for nonparticipants who exercise at home or another facility than for low adherers. The scores of other comparison groups fall between these two groups. The one-way ANOVA analysis showed a large
significance level for this subscale (F ratio=11.28, F probability=.00, p<.01).

As shown in Tables 6 and 7, a post hoc comparison test was conducted that found significant differences between several groups for the inconvenience subscale. The post hoc analysis showed the following group differences: high adherers and both dropout groups (A and B), high adherers and both nonparticipant groups (A and B), and low adherers and nonparticipants who exercise at home or another facility (group B). Thus, inconvenience is a powerful indicator of the level of exercise adherence among subjects.

Other Obstacles Subscale

The results for the analysis of the "other obstacles subscale" are very similar to those of the inconvenience subscale. The "other obstacles" subscale includes items, such as "exercise is boring", "lack of suitable equipment", and "crowded classes". Table 6 details the mean scores and standard deviation scores of the subscale. Again, the range of scores is very broad, from m=8.65 to m=10.67 with an overall possible range score of 4 to 16. Furthermore, the nonparticipants that do not exercise at all (group A) rated these four items the highest as barriers to exercise adherence among all comparison groups. The one-way analysis showed significance among the comparison groups at the p<.01 level (F ratio=13.62, F probability=.00).

The post hoc comparison analysis showed significant
differences among the groups: high and low adherers, high adherers and both dropout groups (A and B), high adherers and both nonparticipant groups (A and B), and low adherers and both nonparticipant groups (A and B). This analysis showed that among all groups, high adherers rated the "other obstacles" the lowest as a barrier to exercise adherence. Again, the findings are consistent with the assumption that those who do not exercise will perceive "other obstacles" as significant barriers to exercising on a regular basis.

In summary, the perceived barriers to exercise were shown to be a powerful influence to exercise adherence. Subjects from the high and low adherer groups believe that barriers to exercise are not as influential to their exercise regimen as other factors related to exercise frequency. Conversely, the nonparticipants and dropouts (A and B) rated perceived barriers as more of an influence to their exercise behavior. The more a barrier is thought of as important, the less adherence to exercise the subjects demonstrated. The results of three of the five subscales are consistent with the results of the overall barriers scale. The subscales that showed significance at the p<.01 level are the effort, inconvenience, and other obstacles subscales. Overall, hypothesis #4 is accepted at the p<.01 level of significance.
CHAPTER V

DISCUSSION

Summary and Conclusions

Researchers must identify the determinants of employee participation in worksite programs in order to increase program participation and adherence (Slenker, Price, Roberts, & Jurs, 1984). The health benefits of regular physical activity are widely known and justify our involvement in health-promoting behavior. Despite the overwhelming evidence that regular physical activity improves health, the majority of Americans either do not choose to participate in regular exercise or discontinue exercise after a brief period. To successfully increase participant adherence in health and fitness programs, the factors that influence adherence must be determined.

The study was designed to determine factors that might have an influence on exercise behaviors. Since behavior patterns have been found to differ among persons at various stages of exercise adherence, this study has incorporated six patterns of exercise behaviors to ascertain differences in the specific factors that influence each pattern of exercise behaviors (Sallis & Hovell, 1990). The six patterns of exercise behaviors were grouped as: high adherers, low
adherers, dropouts who do not exercise (dropout A), dropouts who exercise at home or another facility (dropout B), nonparticipants who do not exercise (nonparticipant A), and nonparticipants who exercise at home or another facility (nonparticipant B).

To identify the factors that influence the six comparison groups (high adherers, low adherers, dropout A, dropout B, nonparticipant A and nonparticipant B), a 66-item questionnaire was distributed via inter-office mail to 900 subjects at Texas Instruments in Dallas, Texas in Fall, 1993. Two follow-ups were distributed in order to ensure an adequate sample was achieved. Forty-seven percent of the questionnaires were completed yielding a sample of 431 subjects.

Based on the responses to three questions on the questionnaire (questions 5, 5a and 5c in Appendix C), the subjects were placed into one of the six comparison groups operationally defined in Chapter 1. Responses of the six comparison groups were then analyzed based on questions pertaining to four categories of factors that have been shown in previous research to influence exercise adherence. The four categories of factors included: self-motivation scale (SMS); attitudinal commitment scale (ACS); predisposing, enabling, and reinforcing factors scale (PERS); and barriers related to exercise adherence scale (BRES). The four hypotheses posited that differences would be found among the
comparison groups for each of the four scales.

By analyzing responses to all four scales, the findings showed significance in two of the four scales. The ACS and PERS scales were the only ones that did not yield significant findings based on a one-way ANOVA analysis. This finding was different from the results of Steinhardt and Carrier (1989). In their study of employees at Conoco, they found that adherers and nonadherers discriminated based on attitudinal commitment ($p<.05$).

The first hypothesis posited that the level of self-motivation would vary among the comparison groups. In other words, the subjects' level of exercise adherence would be reflective of their level of self-motivation. The hypothesis was accepted by the results that indicated that the higher scores on the SMS the higher the levels of exercise adherence.

The findings showed that the level of self-motivation, as assessed by the SMS, was predictive of the level of exercise adherence for this sample. Health practitioners might consider using the SMS as a screening device for participants in their exercise programs. Interventions could be designed specifically to maintain an acceptable level of exercise adherence for participants who are at risk of dropping out of their exercise regimens.

Attitudinal commitment towards exercise was found not to be a significant factor influencing exercise adherence.
Therefore, health practitioners should not focus on changing attitudes of participants in order to increase exercise adherence. Other factors, such as self-motivation, should be addressed because they were found to be significant indicators of exercise adherence.

The PERS was derived from the work of Green and Kreuter (1991) who stated that predisposing, enabling, and reinforcing factors affect individual behavior with each of the three categories of factors having a different influence on behavior. Hypothesis #3 postulated that the six comparison groups would differ based on responses to the PERS. Based on this thinking, it was concluded that the predisposing, enabling, and reinforcing factors related to exercise collectively would measure higher for those groups who exercise than for those who do not exercise. This hypothesis was rejected, however, the results indicate a significant difference at the subscale level.

By analyzing each of the predisposing, enabling, and reinforcing subscales individually, a greater understanding of how these factors influence exercise behaviors was obtained. For example, a person may know the benefits of exercise, however, the knowledge itself may not be the only motivation for regular exercise. Factors such as convenience or social support may have a greater influence on exercise behavior than a predisposing factor such as knowledge. Based on this rationale, the predisposing, enabling, and
reinforcing factors were analyzed separately to assess their level of influence on exercise behavior.

The results from the predisposing subscale reinforce the writings of Green and Kreuter (1991) which state that predisposing factors have an influence on the health behaviors of individuals. In this case, the low and high adherers showed a high knowledge of the benefits of exercise and the consequences of not exercising, as well as believed that "exercise is fun and enjoyable". Conversely, the nonparticipants who do not exercise (nonparticipant A) showed lower knowledge of the benefits of exercise and tended not to believe that "exercise is fun and enjoyable". Again, the results indicate that the low and high adherers are partially motivated to exercise due to their beliefs and attitudes toward exercise. Therefore, the health practitioner should be aware of the high and low adherers' knowledge, attitudes, and beliefs regarding exercise, and use this information to promote exercise adherence during times when adherers are at greatest risk of dropping out of programs.

The enabling factors revealed no significant differences among the comparison groups. The findings are similar to the work of Green and Kreuter (1991) which concluded that enabling factors influence health behaviors. The enabling factor of flexible work hours received the highest rating from the respondents. Conversely, on-site child care received the lowest rating. The low rating may reflect the
mean age (36-45) and marital status (74%) of the sample. Therefore, the health practitioner should consider promoting flexible work hours to increase participation and adherence rates at worksite fitness facilities.

The reinforcing subscale measured the importance of social support, tangible benefits, incentives, and/or peer support as related to their potential impact on exercise behavior. The reinforcing subscale indicated that both dropout groups (A and B) were highly motivated to exercise with the use of reinforcements. Conversely, both of the nonparticipant groups (A and B) scored the lowest on this scale, thereby, indicating that reinforcements such as incentives and social support are not optimum ways to change nonparticipant exercise behaviors. In the area of exercise reinforcements, two factors rated as "most important", method of staying in shape and method to reduce stress. Therefore, using reinforcements to reduce the number of dropouts in an exercise program is a viable option. More specifically, using tangible measurements of improvement may promote adherence to exercise and reduce the dropout rate.

Hypothesis #4 was accepted based on the study findings that showed that barriers to exercise have an influence on exercise adherence. Among all six groups, it was found that the dropouts and nonparticipant who do not exercise at all (dropout A and nonparticipant A) rated barriers as the highest in influencing their decision to exercise. On the
contrary, the high adherers rated barriers as the least important influence on their exercise behavior as compared to the other three groups. Therefore, barriers such as "too tired", "too busy", and "too crowded" should be considered when attempting to motivate nonparticipants to exercise.

Time as a barrier to exercise adherence did not differentiate among the six comparison groups. This finding was different from that found by Godin et al. (1994). In their study, time was the universal perceived barrier among three comparison groups: general population, coronary heart disease individuals, and pregnant women.

Effort as a barrier showed different results as compared to the time subscale. The high adherers ranked effort the lowest among the comparison groups as an influence on their decision to exercise. The dropouts who do not exercise (dropout A) ranked effort the highest among the groups followed by the nonparticipants who do not exercise (nonparticipant A). This finding is consistent with the findings of Steinhardt and Dishman (1989). In their study of college students, Steinhardt and Dishman (1989) found that barriers such as "lack of time", "too tired", and "too lazy" had a negative impact on exercise adherence. This study found that the barrier of being "too tired" had the highest mean score of all effort variables. As demonstrated on the SMS, the high adherers scored the highest on self-motivation, therefore, predictably the high adherers would score
relatively low on the effort subscale measuring motivation as a barrier to exercise. The findings are consistent between the SMS and the effort subscale for all comparison groups. Again, this finding emphasizes the need for creative solutions to promote exercise adherence within the nonparticipant and dropout groups.

In the study, physical ability as a barrier yielded no significant results, whereas Steinhardt and Dishman (1989) found that limited health was a factor that may influence the level of exercise adherence in college students. Conversely, the inconvenience subscale demonstrated similar results to other studies (Franklin, 1988; Steinhardt & Dishman, 1989). In this study, inconvenience was important to the dropouts and nonparticipants in their decision not to exercise. In particular, the nonparticipants who exercise at home or another facility (nonparticipant B) perceived inconvenience of the Texins facility the highest among all groups. Even though the Texins Health and Fitness facility was located on the TI campus, these two groups collectively perceived the location and the scheduling of the classes as inconvenient. Scheduling the fitness classes at more convenient times (e.g. early morning, lunch, evening) may encourage participation and reduce the dropout rate. Furthermore, scheduling more classes would help reduce the crowding, thereby, encouraging more participation as well. Crowded classes was also rated high as an obstacle for dropouts and nonparticipants.
Implications For The Health Practitioner

The results of this study present several important implications which the health practitioner may consider when attempting to promote or sustain adherence to an exercise program. A crosstab analysis yielded interesting results related to exercise adherence over time between the low and high adherer comparison groups. Figure 1 details the results of the crosstab analysis. Exercise adherence varies dramatically among the low and high adherers over time. The patterns of the low and high adherers over time show that the lowest level of participation falls between six months and one year for low adherers, and at one to two years for the high adherers. The low adherers membership declines consistently until around year one, whereas the high adherers' membership sharply declines between the first and second years.

Health practitioners will need to observe the patterns of the low and high adherers so as to promote the continuation of their exercise programs during the low levels of participation. Interventions that specifically address the adherence patterns of the high and low adherers should be implemented to achieve a more consistent pattern of exercise over time for both groups, and to prevent a rise in the dropout rate.

The results indicate that the high adherers perceive the predisposing factors as very important in their decision to
Figure 1. Texins Utilization According to Length of Membership

- 3 times/week or more
- < 3 times/week
exercise. Therefore, implementing interventions to promote adherence to exercise among the high adherers should include elements of the predisposing factors. For example, the health practitioner might consider disseminating information to high adherers about the health consequences of not exercising and the health benefits of exercise. This intervention would be most beneficial during the first two years of participation when the tendency for high adherers to dropout is the greatest.

In addition, interventions for low adherers should incorporate different factors. The results show that the low adherers, like the high adherers, are highly influenced to exercise by predisposing factors. However, the evidence also suggests that barriers to exercise also influence the low adherers' decision to exercise. Again, health practitioners must use knowledge about the benefits of exercise to promote exercise adherence among this group, but should consider reducing the perceived barriers to exercise, such as boredom or overcrowded conditions. The health practitioner can provide various forms of entertainment (e.g. television, radio, and variety) to reduce the boredom experienced by the low adherer. Also, additional classes, space, or variety to programming may reduce overcrowding, thereby, promoting greater attendance.

The results show that the dropouts (A and B) are highly influenced by reinforcing factors in their decision to
exercise, and scored relatively low on self-motivation. Therefore, to reduce the number of dropouts, the health practitioner may want to create incentive programs that specifically reinforce exercise adherence and motivate the individuals to exercise. The incentive programs should target all individuals in an exercise program, since both high and low adherers have the potential to drop out of an exercise regimen.

The results on barriers to exercise adherence are consistent with the findings of Franklin (1988) and Green and Kreuter (1991). The results showed that dropouts and nonparticipants (A and B) perceive barriers to exercise to be a greater influence on their decision not to exercise than high and low adherers. Therefore, health practitioners must continually strive to reduce the perceived barriers to exercise by offering a convenient location for the fitness facility, comprehensive hours, flexible class scheduling, availability of staff, and variety in programming. When the barriers to exercise are reduced, the potential of converting nonparticipants and dropouts to exercise adherers increases.

Another pattern related to exercise adherence was found between the level of exercise adherence and smoking status. The percent of respondents that smoked for the overall sample was 9.3%. The interesting results were found when analyzing the comparison groups based on the responses to this question. It was found that the nonparticipants (13.8%),
dropouts (9.8%), and adherers (.9%) responses were consistent with their level of exercise. Therefore, health practitioners need to promote exercise adherence among the smokers using reinforcing factors in their program because the smokers tend to dropout or never participate in exercise.

Lastly, a large percentage of persons (54.3%) responded that they exercise at home. The health practitioner must take this into consideration when implementing programs for employees. Perhaps programs that can be completed at home should be considered so as to promote exercise adherence among those employees who do not want to exercise at the on-site fitness facility. Promoting programs that can be implemented at home also reduces barriers related to exercise (e.g. child care, overcrowding, scheduling), therefore, nonparticipants and dropouts will have a greater tendency to adhere to regular exercise. Furthermore, exercise programs completed at home expose family members to healthy behaviors which, in turn, may influence their participation in regular exercise.

Future Research

The growing awareness of the mutual benefit of health and fitness programs for employees and corporations has led to more health-related programs implemented at worksites. Even with the growth and improvements of new worksite wellness programs, the lack of employee participation remains a major problem for worksite wellness directors (Dishman,
1988). Future research in this area is necessary for the continued success of worksite wellness programs in realizing benefits for both the employee and employer.

This study showed that the dropouts and nonparticipants had lower levels of self-motivation than the adherers (high and low), but the results did not explain why there was a difference among these groups. Further research in this area should be conducted to provide greater explanation of the variations found in self-motivation.

Moreover, research into the type of motivation and incentives that increase exercise adherence of nonparticipants and dropouts is necessary. This study showed that reinforcement factors, such as incentives, are an important influence on the decision to exercise, however, more research on the most effective incentives to increase adherence is needed.

In addition, further examination as to why the nonparticipants perceived themselves as "too tired" or "too busy" to exercise may provide insight into ways to recruit "hard-to-reach" nonparticipants to exercise on a regular basis. More research on the motivations and barriers of the nonparticipants is needed so that interventions can be developed to specifically target this group. This research is important since previous research has shown that nonparticipants, in general, engage in more unhealthy behaviors, such as smoking and overeating. (Dishman &
Gettman, 1980; Lovato & Green, 1990; Martin & Dubbert, 1985).

If this study were to be duplicated at another major location, a few recommendations for future research are needed. First, the primary site of exercise for the subjects must be defined in the questionnaire. Second, the inclusion of height and weight indices might produce interesting comparative results. Lastly, information regarding exercise adherence behaviors beyond two years of participation might demonstrate different adherence patterns over time among the subjects based on length of participation or seasonality.

Finally, researchers should explore different approaches to assessing the barriers and motivations to exercise among different populations. As Godin et al. (1994) found, the barriers to exercise differ among various populations. Therefore, more comprehensive assessment tools are necessary to provide accurate information so that effective interventions can be implemented to promote exercise adherence among various populations.

Since health care costs are currently a national focus and are consistently on the rise, it is important for us to find ways to reduce those rising costs. Worksite wellness programs provide an avenue to do this. Therefore, it is important to find ways to increase exercise adherence to worksite wellness programs in an effort to contain rising health care costs.

As the number of worksite wellness programs increase
coupled with the rise in health care costs, research in the area of exercise adherence will become increasingly important to society. The evidence produced by further research in this area will provide information to improve wellness programs, increase the participation rates in the programs, increase the success of health promotion efforts in the corporate setting, and thereby reduce health care costs attributed to lifestyle-related behaviors.
APPENDIX A

INTRODUCTORY COVER LETTERS
November 2, 1993

Dear Texas Instruments Employee:

I am a graduate student at the University of North Texas conducting a research project on the factors influencing participation in the Texins Health and Fitness Program. You have been chosen to participate in the project on a voluntary basis. You can discontinue your participation at any time.

You can be absolutely assured that all of the information you provide will be considered strictly confidential. Your answers are extremely significant to this study and will be combined with those of other employees to be used only for statistical analysis. Under no circumstances will any individual employee be personally identified.

The questionnaire has been designed so that you can complete it very quickly and easily. It will take approximately ten minutes of your time. Upon completion of the questionnaire, please seal it in an inter-office envelope and send to:

Steve Fischer
Health Fitness Director
Texins Association
Mail Station 324

I appreciate your assistance with this project. Your candid responses are extremely critical for the successful completion of this study. Should you have any questions, please do not hesitate to call me at (214) 368-1161. Thank you for your time.

Sincerely,

Kathy C. Orsak

Kathy C. Orsak

Chwee Lye Chng, PhD.
Professor of Kinesiology,
Health Promotion, and Recreation
University of North Texas
Major Professor of Thesis
January 3, 1994

Dear Texas Instruments Employee:

You were selected to participate in a research project related to factors influencing participation in the Texins Association Health Fitness Program. A cover letter and questionnaire dated November 2, 1993 were sent to you in early December for completion. If you have already completed and returned the questionnaire, I thank you for your response.

If you have not completed the questionnaire, please remember that your response is important for the success of this study. The questionnaire should only take approximately ten minutes of your time. Upon completion, please seal it in an inter-office envelope and send to:

Steve Fischer
Health Fitness Director
Texins Association
Mail Station 324

I appreciate your assistance with this project. Should you have any questions, please do not hesitate to call me at (214) 368-1161. Thank you for your support.

Sincerely,

Kathy C. Orsak

Chwee Lye Chng, PhD.
Professor of Kinesiology, Health Promotion, and Recreation
University of North Texas
Major Professor of Thesis
January 22, 1994

Dear Texas Instruments Employee:

Your response to the enclosed questionnaire is important for the success of this project. You were selected to participate in a research project related to factors influencing participation in the Texins Association Health Fitness Program. A cover letter and questionnaire dated November 2, 1993 were sent to you in early December for completion. I have enclosed an additional copy of the questionnaire in the event that you do not have your original copy.

This is your last opportunity to contribute to this project. Please remember that your response is important for the success of this study. The questionnaire should only take approximately ten minutes of your time to complete. Upon completion, please seal it in an inter-office envelope and send to:

Steve Fischer
Health Fitness Director
Texins Association
Mail Station 324

If you have already completed the questionnaire, I appreciate your response and please disregard this notice. Should you have any questions, please do not hesitate to call me at (214) 368-1161. Thank you for your time.

Sincerely,

Kathy C. Orsak

Chwee Lye Chng, PhD.
Professor of Kinesiology,
Health Promotion, and
Recreation
University of North Texas
Major Professor of Thesis
APPENDIX B

QUESTIONNAIRE
EXERCISE ADHERENCE
QUESTIONNAIRE

PLEASE CHECK THE APPROPRIATE BLANK.

1. What is your sex?
   ____ 1. Male
   ____ 2. Female

2. What is your age?
   ____1. 18-25 ____2. 26-35 ____3. 36-45 ____4. 46-55 ____5. 56+

3. Do you smoke?
   ____ 1. Yes   ____ 2. No

4. What is your marital status?
   ____1. single  ____2. married  ____3. divorced  ____4. separated

5. Where do you exercise? (may choose more than one if appropriate)
   ____ 1. don't exercise   ____ 2. home   ____ 3. Texins   ____ 4. other facility

5a. What is your current involvement with the Texins Fitness Program?
   ____ 1. Currently a participant
   ____ 2. Have attended at least once but do not currently participate (skip questions 5b and 5c)
   ____ 3. Never attended (skip questions 5b and 5c)

*ANSWER THE NEXT TWO QUESTIONS ONLY IF YOU ARE A CURRENT PARTICIPANT OF TEXINS.*

5b. How long have you been exercising at the Texins facility?
   ____ 1. less than three months
   ____ 2. three to six months
   ____ 3. more than six months but less than 1 year
   ____ 4. 1 - 2 years
   ____ 5. over two years
5c. On the average, how often, per week, have you used the fitness center in the last 6 months?

___ 1. less than three times per week
___ 2. three or more times per week

FOR EACH OF THE FOLLOWING STATEMENTS INDICATE HOW CHARACTERISTIC THE STATEMENT IS WHEN APPLIED TO YOU. CIRCLE THE NUMBER OF YOUR CHOICE.

1 = Very Uncharacteristic
2 = Somewhat Uncharacteristic
3 = Not Sure
4 = Somewhat Characteristic
5 = Very Characteristic

6. I can persevere at stressful tasks, even when they are physically tiring or painful.............

7. If something gets to be too much of an effort to do, I'm likely to just forget it.............

8. I'm really concerned about developing and maintaining self-discipline.............

9. I don't work any harder than I have to..........

10. I seldom work to my full capacity..........

11. I'm just not the goal-setting type..........

12. I'm willing to work for things I want as long as it's not a big hassle for me..........

13. I have a lot of self-motivation.............
<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.</td>
<td>I get discouraged easily........................................</td>
</tr>
<tr>
<td>15.</td>
<td>I don’t like to overextend myself................................</td>
</tr>
<tr>
<td>16.</td>
<td>I tend to be overly apathetic........................................</td>
</tr>
<tr>
<td>17.</td>
<td>I like to take on jobs that challenge me................................</td>
</tr>
<tr>
<td>18.</td>
<td>I change my mind about things quite easily............................</td>
</tr>
<tr>
<td>19.</td>
<td>I have a lot of willpower................................................</td>
</tr>
<tr>
<td>20.</td>
<td>Things just don’t matter much to me.....................................</td>
</tr>
<tr>
<td>21.</td>
<td>I avoid stressful situations.............................................</td>
</tr>
<tr>
<td>22.</td>
<td>I never force myself to do things I don’t feel like doing...............</td>
</tr>
<tr>
<td>23.</td>
<td>It takes a lot to get me going..........................................</td>
</tr>
<tr>
<td>24.</td>
<td>Whenever I reach a goal, I set a higher one.............................</td>
</tr>
<tr>
<td>25.</td>
<td>I can persist in spite of failure.......................................</td>
</tr>
<tr>
<td>26.</td>
<td>I try to force myself to take time out of my busy schedule to stay in good physical condition................................</td>
</tr>
<tr>
<td>27.</td>
<td>My family commitments often interfere with my opportunity to be active.............</td>
</tr>
</tbody>
</table>
28. Being in good physical condition is an important goal in my life. I am unhappy with myself when I let other commitments interfere with my commitment to exercise. 1 2 3 4 5

29. I am too involved in my work to do very much physical activity. 1 2 3 4 5

30. I don't feel that regular physical activity is important. 1 2 3 4 5

31. I've noticed that when I am happier with my physical fitness level, I am also happier at work. 1 2 3 4 5

32. At the present time, I have too many obligations to participate in physical fitness activities. 1 2 3 4 5

IF YOU EXERCISE, HOW IMPORTANT ARE THE FOLLOWING ISSUES IN INFLUENCING YOUR DECISION TO EXERCISE ROUTINELY? IF YOU DON'T EXERCISE, HOW IMPORTANT WOULD THE FOLLOWING ISSUES BE IN INFLUENCING YOU TO START EXERCISING? PLEASE RATE EACH ISSUE USING THIS SCALE:

1 = Not At All Important
2 = Not Very Important
3 = Somewhat Important
4 = Very Important
5 = Extremely Important

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not At All Important</th>
<th>Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. Understanding the health consequences of not exercising.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>34. Understanding the benefits of physical activity.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>35. Believing exercise reduces stress.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

4
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.</td>
<td>Believing exercise helps me stay in shape</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>37.</td>
<td>Believing that exercise is fun and enjoyable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>38.</td>
<td>Liking the leaders/instructors of the Health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>and Fitness programs and classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Having on-site child care provided by the Health and Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>40.</td>
<td>Having access to Health and Fitness Trainers or Personnel</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>41.</td>
<td>Having a variety of programs offered</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>at the Health and Fitness Facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Offering flexible work hours by your company</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>43.</td>
<td>Believing exercise promotes teamwork and companionship</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>44.</td>
<td>Having my doctor advise me to exercise regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>45.</td>
<td>Offering incentives for regular participation in the Health and Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>Having a spouse/closest friend support my participation in the Health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>and Fitness Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>Having my supervisor support my participation in the Health and Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>48.</td>
<td>Having my co-workers support my participation in the Health and Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
EVEN PEOPLE WHO EXERCISE ROUTINELY OCCASIONALLY DON'T EXERCISE. ON THOSE OCCASIONS THAT YOU DON'T EXERCISE OR IF YOU DON'T EXERCISE AT ALL, INDICATE THE LEVEL TO WHICH YOU AGREE OR DISAGREE WITH THE STATEMENTS BELOW IN INFLUENCING YOUR DECISION NOT TO EXERCISE? PLEASE RATE EACH STATEMENT USING THIS SCALE:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly Disagree</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not Sure</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

**Time:**

49. I am too busy .................................................. 1 2 3 4 5

50. I have family obligations that require much of my time .................................................. 1 2 3 4 5

51. My work requires much of my time .................. 1 2 3 4 5

**Effort:**

52. I am too lazy .................................................. 1 2 3 4 5

53. I don't have any motivation ............................. 1 2 3 4 5

54. I am too tired .................................................. 1 2 3 4 5

**Physical Ability:**

55. I have a physical disability ............................. 1 2 3 4 5

56. I am suffering from an illness .......................... 1 2 3 4 5

57. I do not have the skills required to perform exercise-related activities .................. 1 2 3 4 5
Inconvenience:

58. The location of the facility is too inconvenient.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

59. The scheduling of the Health and Fitness Programs is too inconvenient.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

Other Obstacles:

60. I think exercise is boring.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

61. There is a lack of suitable equipment for me.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

62. Exercising at the Health and Fitness facility is too expensive.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

63. The exercise classes are too crowded.  
   Strongly Disagree  Strongly Agree  
   1  2  3  4  5

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN AN INTER-OFFICE ENVELOPE ADDRESSED TO:  
STEVE FISCHER  
HEALTH FITNESS DIRECTOR  
TEXINS ASSOCIATION  
MAIL STATION 324

THANK YOU.
APPENDIX C

PANEL OF EXPERTS
PANEL OF EXPERTS

Dr. Steve Blair, P.E.D.
Director of Epidemiology
The Cooper Institute for Aerobics Research
12330 Preston Road
Dallas, Texas 75230

Donna Israel
Fitness Formula
1131 Rockingham
Suite 128
Richardson, Texas 75080

Molly Meehling
EDS
5400 Legacy Drive
MS:Fl-1A-02
Plano, Texas 75024

Rebecca Bender
President of Association for Worksite Health Promotion (AWHP)
Dynamic Health
6320 LBJ Freeway
Suite 121
Dallas, Texas 75240

Sherry Read
Planning and Evaluation Consultant
American Heart Association
7272 Greenville Avenue
Dallas, Texas 75231

David Dahlke
Health Fitness Coordinator
Blue Cross Blue Shield of Texas
1201 S. Sherman Street
Suite 220
Richardson, Texas 75081
APPENDIX D

HUMAN SUBJECTS EXEMPTION FORM
August 5, 1993

Kathy Orsak
5832 Meadow Crest
Dallas, TX 75230

Dear Ms. Orsak:

Your proposal entitled "Factors Affecting Exercise Adherence Among Participants, Non Participants, and Dropouts of a Worksite Health and Fitness Program," has been approved by the IRB and is exempt from further review under 45 CFR 46.101.

If you have any questions, please contact me at (817) 565-3946.

Good luck on your project.

Sincerely,

Sandra Terrell, Chair
Institutional Review Board

ST/td
REFERENCES


