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I am submitting herewith a dissertation written by Janet Lynn Cox entitled "The Effect of Health Instruction and Counseling on Adherence of Women to an Exercise Program." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Health Education.

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THE EFFECT OF HEALTH INSTRUCTION AND COUNSELING ON
ADHERENCE OF WOMEN TO AN EXERCISE PROGRAM

A Dissertation

Presented for the

Doctor of Education

Degree

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Janet Lynn Cox

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DEDICATION

To my husband and friend, Ron, whose faith in me was unshakable,
whose encouragement was unmatched and who will always have my love.

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ABSTRACT

It is generally accepted that regular physical activity plays an important role in maintaining optimal health. Lifestyles of today are not conducive to obtaining levels of activity great enough to produce desired physiological changes. Therefore, leisure time exercise programs must be adopted, at a sufficient intensity, duration and frequency to achieve beneficial results. A change from a relatively sedentary existence to a physically active one is a major behavioral adaptation for most individuals. The challenge for health and physical educators is to develop and utilize strategies that are effective in influencing individuals to incorporate and maintain physical activity into their daily routine.

The purpose of this study was to determine the effect of two programs, that is, health instruction and counseling, on adherence of women to an exercise program. Sixty-eight women enrolled in various exercise classes at local Y.M.C.A.'s were divided into the following groups: (1) dance instruction, (2) dance counseling, (3) fitness instruction, (4) fitness counseling, (5) control dance, and (6) control fitness. The treatment sessions were conducted at the end of exercise class. The health instruction program consisted of mini-lectures on topics relating to physiology of exercise, beneficial effects of regular activity, advice on practical aspects of exercise, and related health issues. The counseling program involved learning behavior change techniques by targeting a behavior, exploring and implementing ways of changing the target behavior, developing a long

range exercise program and committing to its adoption. Data were obtained using a questionnaire at pre-treatment collection and follow-up contact by phone at 6 and 10 months post-treatment.

Level of leisure time physical activity was determined by calculating the caloric expenditure for all activities reported. Comparisons were made between all groups on activity levels, frequency, duration, intensity, as well as other influential factors and demographic variables, at three data collection points using one-way Analysis of Variance and Chi-square to test for significant differences. It was found that the dance counseling group expended significantly more calories and exercised at greater intensity than fitness control group at 6 months post-treatment, and dance control and fitness control at 10 months post-treatment. These differences in activity level could not be explained by differences found on any other variable.

It was concluded that based on the groups used in this study, the health instruction program utilized had no influence on adherence. A behavior-influencing program may be helpful in affecting adherence, although other factors must be considered, such as, the type of exercise chosen.

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CHAPTER I

INTRODUCTION

In recent years there seems to have been a renewed interest in exercise in this country. There are an estimated 7 million joggers, 15 million regular cyclists and 15 million serious swimmers (U.S. DHEW Task Force, 1978) among the adult population. Based on several surveys, Serfrass and Gerberick (1984) reported approximately 50% of the American people over 18 are engaging in some form of regular exercise. More conservative estimates put the figure at a little over 35% (Wilmore, 1982). Further, Wilmore (1982) reported that among several groups who demonstrate a disproportionately low rate are women. Individuals most likely to engage in regular exercise are male, younger, more highly educated, more affluent, and are professional or white collar workers. This does not account for a large group of citizens who are just as susceptible to chronic conditions which are related to physical inactivity.

There exists some controversy regarding the full role and importance of regular exercise in preventing certain chronic conditions, although scientifically unproven claims are not always acknowledged by those who are strong advocates of exercise. One faction argues that exercise does not influence the onset of chronic diseases if one is susceptible, nor does it prolong life. This avenue of thought is based on the belief that genetic factors are more influential than individual living habits in affecting chronic disease

susceptibility. Proponents of regular activity argue that lifestyle habits do have great influence in determining one's health status. A study undertaken in Alameda County, California in the mid-sixties (Belloc, Breslow, and Hochstim, 1971; Belloc and Breslow, 1972; Belloc, 1973) compared physical health status with personal habits. The researchers identified six practices which were related to health status, one of which was physical activity. When adjusted for the normal increase in mortality by age, men who reported engaging in active sports had the lowest mortality when compared to men who seldom exercised. It was further reported that few women engaged in sports, but the group who had the lowest mortality participated in swimming, gardening and other activities. These data may indicate that physical activity is one factor which can contribute to one's overall good health. Yet this study, as well as epidemiological studies which have looked at the relationship between physical activity and the most widespread of chronic diseases, coronary heart disease (CHD), do not prove a cause-effect relationship, that is, that sedentary lifestyles cause chronic diseases, especially CHD. They have shown an inverse relationship between physical activity and CHD and the most recent studies are encouraging (Clarke, 1979).

It is interesting that even researchers who question the notion that regular exercise itself reduces the risk of CHD continue to suggest physical activity should be adopted as part of one's lifestyle (Froelicher, Battler, and McKirnan, 1980; Hartung, 1977; Fox and Paul, 1969). ". . . most researchers believe that those who exercise have decreased their risk of developing cardiovascular disease but have

been unable to prove it" (Kolata and Marx, 1976, p. 512). As important, however, are other benefits which can be derived from regular activity, all of which have been clearly demonstrated as having the potential for improving one's overall health status, and which need more emphasis.

Although regular physical activity is not considered a primary risk factor in developing CHD, it is considered a secondary risk factor, that is, inactivity increases the risk of developing CHD if other risk factors are present. Regular exercise can also affect several other risk factors of CHD. Inactivity is associated with excess weight, elevated cholesterol level and higher blood pressure (U.S. DHEW Surgeon General's Report, July 1979). Exercise has been advocated as an important part of any weight loss or weight maintenance program. Besides higher risk for CHD, complications from obesity are many, including high blood pressure, abnormal blood lipid levels, diabetes, respiratory problems, and other circulatory problems.

There is ample evidence that exercise contributes to improved cardiovascular (CV) functioning (Hartung, 1977). There seems to be a general agreement that a "training effect" which can be achieved by regular exercise maintained at a sufficient intensity, can result in the following: (1) decrease in heart rate (HR) at resting or sub-maximal work levels and an increase in stroke volume (SV) which results in improved work capacity, improved CV efficiency in delivering oxygen throughout the body including to the myocardium, and increased arteriovenous oxygen exchange at the muscles; (2) decreased myocardium oxygen requirement for a set amount of work; and (3) blood lipid changes, especially a decrease in triglyceride levels and increase in

high density lipoproteins (HDL) which have the capacity to carry cholesterol to be removed from the body (Leon and Blackburn, 1977; Haskell and Fox, 1974; Froelicher and Oberman, 1972).

Additional physiological benefits derived from exercise, given that the regimen is of sufficient intensity, duration and frequency are: (1) increase in muscular endurance; (2) maintenance of optimal musculo-skeletal function; (3) reduction of body fat and increase in lean body mass, and improvement in cardiorespiratory endurance (Leon and Blackburn, 1977; Pollock, Wilmore and Fox, 1984). If achieved, these improvements in physiological functioning mean increased ability to carry out daily tasks with the least effort and fast recovery, with enough reserve energy to meet emergencies (Leon and Blackburn, 1977). For those individuals with deficiency existing in CV system, it could mean that their heart muscle can compensate somewhat, delaying manifestation of the disease and/or lessening the severity when manifestation does occur.

Some psychological benefits of exercise have been reported although exaggerated claims exist in this area. Several researchers recorded that individuals engaging in regular exercise report improved feelings of well being, that is, a "feeling better" sensation (Brunner, 1969; Mann, Garrett, Farhi, Murray, and Billings, 1969; Morgan, Roberts, Brand and Feinerman, 1970; and Massie and Shephard, 1971) and positive feelings of health and greater ability to deal with stress (Heinzelman and Bagley, 1970), although psychological instruments which have been used in some studies do not always substantiate these subjective reports. Psychological benefits of exercise

seem to exist for those individuals who were having some mental difficulties prior to the exercise program (Popejoy, 1967; Folkins, Lynch and Gardner, 1972). Morgan (1982) has reported that acute and chronic exercise can positively affect emotional well being in individuals who are moderately depressed or anxious.

Finally, once exercise is adopted on a regular basis, many people report changing other poor health habits, for example, smoking, excess alcohol consumption, poor nutritional habits (U.S. Surgeon General's Report, 1979; Thomas, 1979).

If health educators are going to advocate regular exercise as a beneficial habit in maintaining good health, their justification must be accurate and objective. For those individuals who are not convinced of its worth, exaggerating claims, that is, espousing benefits which have not been adequately tested and proven, can only add to existing skepticism. Exercise cannot be considered a panacea for all health problems. Nor can one claim that engaging in regular physical activity will result in a longer lifespan. It can, however, improve physical fitness levels, that is, produce beneficial physiological changes which, in turn, can aid in meeting everyday challenges, both physical and psychological; alter risk factors for CHD; and be an enjoyable endeavor.

Need for the Study

According to a Department of Health, Education and Welfare Task Force (1978) on disease prevention and health promotion, changing individual lifestyles is the most important issue and the one that is

most difficult to achieve. Adopting new habits is as difficult as eliminating poor ones. Our society is primarily a sedentary one. Most occupations, as well as leisure time activities, require little energy expenditure. Typical means of transportation require little work. Adding an exercise program to a normally sedentary existence is a major behavioral change for most people. Determining effective ways of encouraging the incorporation of exercise into one's regular routine is the issue health educators must now address.

Many people are motivated to begin an exercise program, as partly evidenced by a large number of exercise classes being supported and the number of health spas in existence. Unfortunately, these outward signs do not necessarily mean continuously active adults, as long term adherence is the exception among people who begin. Some of the studies reported in the literature which involved looking at program adherence reported an average of 68%, and these programs were only 20 to 28 weeks in length (Mann, et al., 1969; Massie and Shephard, 1971; Pollock, Gettman, Milesis, Bah, Durstine and Johnson, 1977; Gettman, Pollock, Durstine, Ward, Ayres and Linnerud, 1976). If short term adherence is this poor, rates for long term adherence probably would fare much worse. It must, of course, be recognized that these programs differed in participant characteristics and exercise routines (frequency, duration, type of activity, length). But, in general, they show that non-adherence to an exercise regimen is a real problem. Many people who begin exercise do not stay active long enough to make any improvements. What is also noteworthy is that the low adherence rates mentioned above are based primarily on group programs. It has been

suggested that activity within groups is a motivating factor in itself (Franklin, 1978; Hoepful-Harris, 1980) mainly because of peer support. Obviously exercising with a group is not sufficiently motivating to result in program adherence. Long term behavioral changes especially when initial motivational factors are no longer present, require the most serious commitment. That these individuals have shown initial interest in exercise should make them more receptive to influences to continue.

Several motivational techniques have been suggested which might affect compliance to a new regimen (Haynes, Taylor and Sackett, 1979). There have been studies done to test these techniques on programs requiring regimentation, such as pill taking, diet restrictions, and weight reduction (Haynes et al., 1979). Only recently has there been interest in research using behavioral procedures to influence exercise adoption and adherence. A few studies report using motivators to encourage participation, but only as an aside to the main purpose, for example, when participation dropped off, an effort was made to lure participants back (Sime, Stamler and Berkson, 1976). Epstein, Wing, Thompson and Griffin (1980) found that using written contracts and a lottery system (involving refunding money and chances for winning money) did influence attendance and adherence to exercise over a short period of time (5 weeks). Several studies (some yet unpublished but discussed in a review article) have found better adherence when using behavioral strategies such as a buddy system, booster sessions and phone calls, instruction to include significant others, flexible goal

setting, personalized feedback, incorporating distraction and small goals, and contracting (Martin and Dubbert, 1982). These and several additional articles on intervention strategies to affect adherence to exercise will be reviewed in Chapter II.

It is believed that permanent behavioral change occurs when intrinsic motivational factors are present. But intrinsic reasons take time to develop and may not be directly influenced by any one outside factor (Caplan, Robinson, French, Caldwell and Shinn, 1976). Initially, extrinsic influences can be useful in beginning the process of internalizing positive attitudes toward behavioral change. Two that may be helpful are: (1) having basic information as to the benefits of the behavior; and (2) having an awareness of how behavior change can be realized and committing oneself to that change (Serfrass and Gerberich, 1984). Individuals who are given the opportunity to learn and explore more about exercise may develop a more positive attitude towards it. Individuals who are guided in behavior change techniques, including making a firm commitment to regular exercise may be more successful in a permanent adoption of such a routine. The effectiveness of gaining knowledge about exercise and making a commitment toward exercise on a long term basis needs to be further explored.

Until fairly recently, most of the research in the area of exercise involved male subjects. Studies in which adherence rates of subjects were considered followed the same pattern, most using middle-aged, male businessmen (or men in equivalent occupations). Most health conditions that can be caused or complicated by

inactivity are as likely to occur in women as in men. Furthermore, it may be that as a group, women were slower to adopt regular exercise, as it became somewhat fashionable, than men, and therefore, continue to need additional consideration. Hence, female subjects were selected for this study.

x. Purpose of the Study

The purpose of this study was to determine the effect of two motivational strategies, specifically, health instruction and a counseling program, on adherence of women to a regular exercise program.

Statement of the Problem

Pollock, Wilmore, and Fox (1978), Brunner (1969), and Franklin (1978) suggested that programs designed to affect adherence to regular exercise should include an educational component. Hoepfel-Harris (1980) and Sackett (1976), however, indicated that behavioral change approaches have a greater effect. Therefore, this study attempted to determine which of these approaches was more effective. Specifically, this study was designed to answer the following questions:

1. Does a health instructional component of an exercise class make a difference in adherence to regular physical activity?
2. Does a counseling component of an exercise class make a difference in adherence to regular physical activity?
3. Is there a difference in adherence to regular physical activity between those exposed to the health instructional component and those exposed to counseling?

4. Is there a difference in adherence to regular activity between those enrolled in a fitness class and those in an aerobic dance class?

5. What is the adherence rate to regular exercise following completion of an organized group exercise program?

Delimitations of the Study

This study was delimited to the following:

1. Women who participated in beginning exercise classes at either the Knoxville, Tennessee West Side Y.M.C.A. during the second winter session, 1981 or the Central Y.M.C.A. during spring session, 1981.

2. Women in experimental groups who were 20 to 55 years of age and attended a minimum of 70% of all treatment meetings.

3. Women who were available for a follow-up contact at the sixth and/or tenth month following the completion of the session.

Limitations of the Study

This study was limited by the following factors:

1. The subjects volunteered to participate in treatment programs.

2. Activity which continued beyond the Y.M.C.A. class may have been influenced by the season which followed, that is, the weather in the spring and summer may be more conducive to continuing regular exercise.

3. The information given on the questionnaire depended, in part, on the ability of the individual to remember her past behavior.

Basic Assumptions

It was assumed that:

1. The information given by the subjects on the questionnaire and by phone was given honestly and as accurately as possible.
2. An account of one's activity is an indication of adherence to an exercise program.
3. Confounding factors were present equally in experimental and control groups.

Definitions

1. Adherence--continuation of a behavior or routine over a long period of time. Reference in this paper is made primarily to adherence to an exercise program either as part of a research project or as an exercise routine adopted by an individual. For purposes of this study, an adherer either maintained a moderate to high level of caloric expenditure (as defined by Sharkey, 1979) or improved caloric expenditure through physical activity to a moderate to high level. Non-adherers were those women who remained in the least active category (Sharkey, 1979) or dropped from a higher category to the least active group from pre-treatment report to follow-up contact.

2. Attrition--refers to the loss of individuals from the original group or sample. The attrition rate for exercise programs is the percentage of subjects who dropped out of the program or study before its formal conclusion. In this study, rate of attrition was based on the number of subjects who began a treatment program but whose attendance fell below 70%.

3. Counseling program--series of group meetings in which behavioral change techniques based on William Glasser's Reality Therapy were explained, subjects actually attempted behavior change (of a behavior of their choice) and a commitment in the form of a written contract was made to a continuing physical activity program over the next year.

4. Duration--the amount of non-stop time involved in exercise sessions.

5. Frequency--in relation to exercise, the number of times one engages in exercise, the reference point being days per week.

6. Health instruction--series of short lectures (approximately 10 minutes in length) on various topics ranging from physiological effects of exercise to nutrition and weight control (see Appendix C for complete listing). Lectures immediately followed the exercise class.

7. Intensity--as regards exercise, the amount of calories expended per unit of time for specific physical activities.

8. Leisure time physical activity--refers to exercise done as a program in and of itself, and not in connection with daily activities.

9. Motivation--process of being aroused by an inner drive, intention, or impulse which causes a person to do something or act in a certain way.

10. Regular exercise--engagement in leisure time physical activity on a routine basis. An exercise program should be aerobic activity which maintains a heart rate of approximately 75% of maximum heart rate, to be done at least 3 times per week for 30 minute sessions.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

In order to form a link between previous findings relating to the questions addressed in this study and the conclusions drawn herein, literature in the following areas was reviewed: (1) adherence to and attrition in exercise regimens (including rates and reasons for each); (2) cardiac rehabilitation programs which include information on adherence and attrition; and (3) motivation, specifically, motivational techniques that have been used or recommended as effective ways to increase or maintain participation. An examination of this literature led to several basic conclusions. The first was that, despite recent interest, there exists a scarcity of research on adherence to and attrition in leisure time exercise programs. Older research dealt with adherence as a secondary question, the primary one being the physiological effects of regular exercise. Therefore, details in considering the adherence problem were often ignored. The most recent studies have used a variety of behavior and cognitive techniques to affect participation. There have not been sufficient number of studies done, exploring the same type of technique, to be able to draw conclusions regarding their impact. Also missing in the literature are studies on adherence using a large sample and continuing a follow-up over a long period of time.

The majority of research has been done using male subjects, although most recently there has been an increase in the use of females

as subjects. In order to obtain as much background on the subject of adherence to leisure time physical activity, appropriate studies on cardiac rehabilitation programs were reviewed.

Adherence and Attrition in Exercise Regimens

Rates. Attrition from exercise programs reported in the literature range from 18% to 83% (see Table 2.1). The studies will be reviewed in detail by ascending order of attrition rates reported, that is studies reporting lowest rates were reviewed first. Several studies report two rate figures, due either to calculation over time or adjustments made in number of subjects used in the calculations.

The highest adherence rate reported from an exercise program was 81% at the end of 18 months by Oja, Teraslinna, Partanen and Karava (1974). Their subjects were middle-aged (range of ages was 35 to 59 years), manager-executives in Helsinki, Finland who agreed to begin an 18 month exercise study, and matched controls. The researchers organized two different training regimens and made training sessions available at 4 different times each day. The subjects met 3 times per week for 40 to 60 minutes per session and worked at approximately 60 to 70% of their "maximum capacity" (method of determination not reported) for at least 10 minutes. The intensity was monitored by measuring subjects' heart rates during the endurance section of the training. Subjects were to work at a load which produced a heart rate of 140 to 160 beats per minute. The remainder of the time was devoted to warm-up, strength training or ball games. Of the 168 men selected for this study, 13 dropped out (8 from the exercise and 5 from the control group). Five

TABLE 2.1

REPORTED RATES OF ADHERENCE FOR EXERCISE PROGRAMS
BY PERCENT AND LENGTH OF THE PROGRAM

Preventive Programs				
Author(s)	Subjects	Length	% Adherence	% Attrition
Oja et al. (1974) ¹	178 men	18 months (72 weeks)	81%	19%
Harris et al. (1967)	363 men	12 weeks	73%	27%
Pollock et al. (1977) ²	157 men	20 weeks	70.1% ³ 78.6% ⁴	29.9% 21.4%
Gettman et al. (1976) ²	100 men	20 weeks	55% 78.6%	45% 21.4%
Massie and Shephard (1971)	38 men 11 men	28 weeks Group I ⁵ Group Y ⁶	47.4% 81.8%	52.6% 18.2%
Mann et al. (1969)	105 men	24 weeks	59% ⁸ overall 76% ⁷	41% 24%
Gettman et al. (1983)	47 men	20 weeks	65% ⁸ 55% ⁹ 70% ¹⁰	35% 45% 30%
Sime et al. (1976) ³	46 men	30 months (120 weeks) 36 months 38 months ¹¹	54% 24% 17%	46% 76% 83%
Hanson (1976)	101 men	1 year 7 years ¹¹	42% 18%	58% 82%

¹Subjects were selected for being motivated prior to start of program.

²Subjects were inmates from penal institutions.

³Duration group.

TABLE 2.1 (Continued)

- ⁴Frequency group.
- ⁵Independent exercise program (Cooper's Aerobics plan).
- ⁶Y.M.C.A. group exercise program.
- ⁷Eliminated municipal firemen group.
- ⁸Unsupervised group.
- ⁹Supervised group.
- ¹⁰Control group.
- ¹¹Changed or modified protocol of exercise regimen.

dropouts from the exercise group did so early in the study and were replaced. Four more subjects were eliminated from the analysis because of poor participation rates. Given this information, the adherence rate calculated by this writer was 93% (166 participants from 178 total). The authors reported a 19% dropout rate, that is, 81% adherence rate. Oja et al. (1974) were particularly interested in determining if exercise could effect CHD risk factors. Aware of the attrition problem reported in other studies, they adopted a selection process which included screening for high motivation and habitual physical activities, as well as the presence of CHD risk factors and no clinical contraindications for exercising. Furthermore, subjects were assigned to training groups based on their preference for a specific time and type of exercise. Also, the facility was open 2 hours on Saturdays so that missed sessions could be made up. With all these accommodative factors present, it is not difficult to understand the high level of participation. It does, however, make comparisons with other studies difficult. The authors reported more problems with participation toward the end of the study and reported offering subjects instructions for a home training program and a diary for record keeping. No further information is given, except that this procedure allowed the subjects "to maintain the activity . . . at a satisfactory level during the summer even though the participation rate did drop" (p. 463).

Harris, Bowerman, McFadden and Kerns (1967) reported improvements made and problems encountered by a group of middle-aged men who began a 12 week supervised jogging program. Three sessions were monitored (Spring of 1965, Fall of 1965 and Spring of 1966) involving 363 men from

primarily sedentary occupations (in descending order of frequency: salesmen, teachers and professors, executives, office workers, attorneys, physicians and dentists). The groups met 3 days per week either in the early morning (6:30 to 7:00 a.m.) or late afternoons (5:00 to 5:30 p.m.). The exercise regimen consisted of progressive and alternate jogging/walking up to approximately a total distance of $2\frac{1}{2}$ miles. The program was flexible enough to allow for differences in progress, however, the majority of the subjects followed the same, relatively easy, regimen. The authors suggested this light regimen reflected the condition of the subjects. Based on preliminary medical examination, 6 applicants were advised not to participate. Of 100 others, all but 7 over age 40 had some abnormal finding of the heart, lungs or EKG at rest. All were allowed to participate but, in several instances, were closely monitored. Of the 363 subjects, 212 were overweight an average of 17.5 pounds (according to "life insurance statistics") (p. 134). Seventy-three percent of those who began completed the program. The regimen was not complex or demanding and the length of the program was short.

Two studies involved the effects of walking/running program on younger males (age 20 to 35 years) who were inmates in either a county jail or state prison. Pollock et al. (1977) were interested in studying the differences in the effects of endurance exercise by frequency and duration. Subjects were randomly assigned to groups which met either 30 minutes per session for 1 day, 3 days or 5 days per week (frequency) or for 3 days per week for 15, 30 or 45 minutes (duration). The subjects built up the routine gradually until all were working at 85 to 90% of

their maximum HR (max HR). The adherence rate was high: 70.1% for duration groups and 78.6% for frequency groups. There was little to interfere with these men completing the study. Some prisoners were transferred or released but the numbers were not given. Each subject was given a pair of Adidas SL-72 running shoe and a uniform. One would expect that adherence rates would be high for a group of incarcerated men since scheduling problems and other obligations would not exist. Besides the fact that this change in an otherwise unchanging routine might be, in itself, a motivator to continue. The fact that special attention was shown to these men might also have been an incentive. The primary purpose of this investigation was to determine how attrition and injury were related to frequency and duration of training. A more detailed breakdown of rates of injury-causing attrition will be presented in the next section.

Gettman et al. (1976) compared responses to different frequencies (1 day, 3 days or 5 days per week) over 20 weeks using jail or prison inmates as subjects. A session was 30 minutes in length and the intensity of the walk/run routine was graduated, as in Pollock et al.'s study (1977). Fifty-five percent of 100 original subjects completed the program. A large portion of the dropouts (30%) were due to subjects either being released or transferred. Eliminating this group from the computations, adherence rate was 78.6%. Only 15 men quit who remained in the institution throughout the study. Most of the dropouts were from the 5 days per week group (6), compared to 5 who quit from the 3 days per week group and 4 from the 1 day per week group (the remaining dropouts for each group were released or transferred).

Massie and Shephard (1971) were interested in comparing the effectiveness of two different types of exercise programs, as well as to characterize a typical dropout. Middle-aged sedentary businessmen (from 29 to 56 years) were sought either to begin an individual exercise program, based on Cooper's Aerobics, or to join a "low-gear" fitness class at the YMCA. Thirty-eight men initiated an individual program (Group I) while only 11 recruits agreed to join the YMCA class (Group Y). Group Y were required to pay a \$60.00 fee. The class involved meeting 3 times per week, for approximately 45 minutes, to engage in walking, jogging, running and some basic calisthenics. Intensity started low, increased to vigorous for 20 minutes, and tapered down for the last 15 minutes. Each member kept a log noting the time spent in different activities. The I group followed the plan in Aerobics, most earning points by running, all keeping a log of their activities and points earned. Both groups returned to the lab every 2 weeks for evaluation. At the end of 28 weeks, 47.4% (N = 18) of the I group were still participating in Cooper's program while 81.8% (N = 9) of the Y group were still attending class regularly. Of the total number of dropouts (22), 18 quit prior to the midpoint evaluation of the study. In this study, the group activity seemed to retain more participants than the individual one. However, the group members had invested money in this endeavor and the N was small. The I group's regimen seemed to be more physically demanding, at least injuries were reported to be more prevalent (no statistics were given). Also, adverse weather conditions resulted in 10 men from the I group joining an athletic club in order to use indoor facilities.

As with several other studies, Mann et al.'s (1969) concern was whether exercise could improve coronary risk factors and, if so, what amount would be necessary for that improvement to occur. Along with reporting physiological gains, they computed adherence rates and investigated reasons for adherence and non-adherence. One hundred and five male volunteers began the program. The authors state that "volunteer subjects were self-selected for several characteristics, including a tendency to be currently engaged in a physical fitness program or to be apprehensive about personal health because of an ominous family history or a puzzling personal health history" (p. 14). However, upon reviewing the data presented, it appeared that there was little difference between the volunteers and the controls in terms of activity, family history and personal health. For example, 60% of the experimental group reported a family history of either CVD, high blood pressure (HBP) or CHD while 51% of the controls reported the same. Statistical significance, if computed, was not reported. Ten percent of the volunteers reported presently engaged in a fitness program and 7% of controls reported the same. Hypertension was reported by 12% of the exercise group and 11% of the controls. The profiles of the two groups look quite similar. The experimental subjects were divided into five treatment groups of approximately 20 each. Four of the groups trained in the early morning (6:00 to 7:00 a.m.) and the fifth in the late afternoon (5:00 to 6:00 p.m.). The groups were requested to attend four of the available five sessions each week until the maintenance regimen began. They then continued 3 times per week. The study lasted 6 months. Training routine began with each man assigned to one of three

intensity levels (regardless of groups assignments) based on estimated competency for physical exertion. Activities included calisthenics, and alternating walking, jogging and running bouts. Thus, the men worked at different rates, doing the same exercises but working their way through the levels as their fitness improved. After 3 to 5 months, the groups began maintenance regimens. They were also of different intensities, measured by caloric expenditures of 1,175, 1,000, 600, or 300 calories per week (two groups were combined). Overall 59% or 62 men completed 6 months of training, however, there were differences between groups. Group III was composed of municipal firemen. The authors reported that only 3 of 24 completed the program. Eliminating this group, adherence was computed at 76%. This was actually better participation rate than for the controls, of whom 29% became unavailable for evaluations. It appeared that most of those who dropped out did so in the early part of the study, before the maintenance program began. Only two groups had dropouts after week 12, the one which expended the greatest number of calories and the group of firemen which was assigned to the regimen expending the least caloric expenditure. The following factors should be considered when evaluating the adherence pattern of the subjects in this study. The first is the exercise regimen itself. The first phase afforded the subjects opportunity to adjust to strenuous physical activity. But as the subjects reached the upper levels they would have been working out about 40 minutes at a pulse rate increase between 160 to 190 beats per minute, possibly expending up to 400 to 500 calories per hour. In the maintenance phase, several groups also worked at a fairly demanding pace.

The exercise bouts were not all easy. Second, there was little flexibility regarding scheduling the training sessions (only 2 times were offered, weekdays only) and the men were expected to attend 4 times per week (at least through month 5). On the other hand, this study was conducted over a relatively short period of time (6 months). It might be expected that subjects would be more likely to continue knowing the end was within a reasonable time. Lastly, the authors computed the overall adherence with and without their Group III (municipal firemen). They state that they were " . . . most enthusiastic at first but soon lost interest " (p. 17) and only 13% completed the program. Although an unusual group like this colors the overall picture, they cannot be ignored.

The last three studies reported moderate to minimal success in retaining subjects in exercise programs. To explore the influence of a supervised versus unsupervised exercise program, Gettman, Pollock and Ward (1983) recruited 47 sedentary male police officers to begin an exercise program. Preliminary testing was done and they were randomly assigned to three groups: unsupervised exercise, supervised exercise, and sedentary controls. For 4 weeks both exercise groups trained together for 3 days per week, 45 minutes per session including a warm-up period. The unsupervised exercise subjects then chose their own place and time to continue exercising (using the same routine as supervised group and returning to the study site every 2 weeks for a check on training progress and to record data on their home exercise program). The attrition rates were: 35% for unsupervised exercise; 45% for supervised exercise; and 30% for sedentary controls. It was concluded that

a convenient location for exercising is important for adhering to a program. More detailed discussion of the reasons for non-adherence will be forthcoming.

In an attempt to study both physiological effects and adherence in a long-term exercise program, Sime et al. (1976) recruited 46 healthy, sedentary middle-aged males for a minimum 3 year exercise program. Training facilities were available at a Jewish community center, 4 evenings per week (5:00 to 9:00 p.m.) and on Sunday morning (8:00 to 12:00 a.m.). Subjects trained 3 times per week using a bicycle ergometer. Training began with the workload adjusted so that HR reached 120 beats per minute during each bout. After the first 4 weeks, each subject worked at 70% of his age-predicted max HR. During the first 30 months, the adherence rate was 54%. Between 30 and 36 months, however, the participation dropped to 24%. The subjects were offered a continuing jogging program at the end of the study, but 2 months later only 17% or 8 men were still participating. The training sessions offered little group interaction. The authors reported using several incentive programs (a social, team contest and individual awards) in hopes of affecting adherence, however, they reported getting only "modest and temporary improvements" (p. 459). Slightly more than three quarters of those who began this program dropped out before its completion (there was a big drop in the last 6 months of the study, more than one-half remained active up to 30 months), even though the facilities were convenient to all and hours were somewhat flexible. This study was longer in duration than others reported in the literature and there was no flexibility in the training,

that is, only one method of training was used, the bicycle ergometer. At 30 months, the regimen was altered to jogging but this did not seem to help retain subjects. As with most of the studies reporting on adherence, it is not known how many subjects continued an activity program on their own.

In 1966, a special United States Public Health Service committee recommended that studies be undertaken to explore the lack of exercise as a factor in CHD. One such program, the Wisconsin project, invited a group of male faculty members, age 45 to 59 years, who showed no clinical signs of heart disease but who had two or more risk factors of CHD to participate in an organized exercise program. Fifty-nine percent or 101 men agreed. At the end of one year, 71 men remained active in the program (42%). Hanson (1976) reported that 30 men (18%) remained in a modified program after 7 years. More than one-half of those who began the program dropped out during the first year. Because federal support was discontinued at the end of 12 months, a "modest" fee was assessed for each person who continued. Also, college faculty may be a semi-transitory group due to changes in schedules, taking leaves of absences, as well as permanent moves to other campuses.

Based on a follow-up interview, 18 months after the termination of a conditioning program for 36 middle-aged women, MacKeen (1978) concluded that, left to continue on their own, middle-aged women will not adhere and will lose the physiological effects of the training. Of the original 36, MacKeen interviewed 28 subjects regarding their present level of physical activity. Only 40% of the normal weight and 33% of the obese women were engaging in exercise at all, and most of

these at a lower duration than the original program entailed. At the termination interview, 80% of the normal weight subjects and 78% of the obese subjects stated that they intended to continue exercising on their own. The negative difference between intentions and actions regarding exercise was the basis for MacKeen's conclusion.

Generally, continued participation has been a problem. The studies which have been reviewed, however, vary in the exercise regimen, length of the study, and particulars reported about the study (making direct comparisons somewhat difficult). If there is anything aversive to an individual about the program's organization and offering, it is likely that person will drop out regardless of what he/she knows or how he/she feels about exercising in general. On the other hand, it may not be the program, but rather a personal problem or attitude that prohibits an individual from completing a regimen. The next logical step, then, is to explore the reasons people have given for either exercising or dropping out of exercise programs.

Reasons for attrition. A cursory review of the studies which reported reasons given by those who dropped out of an exercise program resulted in the formulation of the following general categories: (1) injuries, including muscle and joint soreness; (2) scheduling problems; (3) objections to the program or regimen; and (4) others. Thus, causes of attrition will be discussed within these categories.

The most often reported aversive factor of exercise was physical impairments (injury or soreness). Most physical problems were corrected by taking time off or following a less strenuous schedule

until healing occurred (Harris et al., 1967; Gettman et al., 1976; Pollock et al., 1977; Mann et al., 1969) but many resulted in the subjects quitting (Harris et al., 1967; Massie and Shephard, 1971; Oja et al., 1974; Mann et al., 1969; Gettman et al., 1976; Pollock et al., 1977). As would be expected, the beginning of training was the most difficult in terms of injuries (Harris et al., 1967; Oja et al., 1974; Mann et al., 1969). Although no figures were given, Harris et al. (1967) suggested that physical discomfort was the major source of discouragement among his subjects and most occurred in the first few weeks. In the Helsinki study, one-half of all cases of injury occurred during the first third of the study. More physical impairments were reported in weeks 1 and 2 of training in Mann et al.'s (1969) study, although statistical significance was not reported.

Harris et al. (1967) reported soreness and aching ankles, legs or back as the most common physical problems. They encouraged their subjects to continue light workouts. Some dropped back to an easier regimen while the more serious cases were encouraged to alternate walking with slow jogging for one-half to 1 mile daily on a grass surface. Despite the accommodation available for the injured, 37% (N = 34) of all the dropouts did so because of "sore legs and backs" (p. 134).

Of the 77 cases of injury reported by Oja et al. (1974), 23 resulted in absenteeism, but most (16) for less than 2 weeks. In terms of overall absenteeism, injuries comprised only 5% of the total. And, although 5 of the 8 dropouts from this program cited medical reasons as the cause, only 1 (a rupture of the Achilles tendon) was a

direct result of the training. Even though injuries were experienced by 42% of all subjects, they did not affect completion of the program to any great extent. The most common site of injury was the leg, including knee, ankle, calf or thigh (N = 36) followed by injuries to the arm, hands and shoulders (N = 24). The group most often affected by these injuries were participating in the walk/run and volleyball regimens.

Almost one-half of the subjects in Mann et al.'s (1969) study developed physical problems. As with Harris et al. (1967), continuing but at a lighter intensity seemed successful in gradually eliminating the problem without the subjects quitting altogether. Apparently, injuries were severe enough or not well tolerated by 28% of all dropouts, for they reported physical impairments as the reason for their departure from the program. The authors noted that six other dropouts gave other reasons for leaving but suffered from some type of physical impairment.

Massie and Shephard (1971) apparently did not systematically record the reasons for attrition from either group (Groups I and Y), but did state that "the incidence of subsequent aching muscles, swollen ankles, and 'shin splints' was far greater in Group I than in Group Y" (p. 112). The dropout rate was almost twice as high in Group I compared with Group Y. The authors speculated that injuries may have contributed to the dropout rate, among other obstacles.

Two studies were designed to pay particular attention to the relationship between injury and intensity of training (Gettman et al., 1976; Pollock et al., 1977). In the first, physical problems of leg muscle soreness and shin splints were especially prominent in the 5 days

per week group. Six of the 13 members of this group reported chronic leg problems throughout the 20 week study and it was necessary to encourage this group more than the others to continue. Of the 6 persons who quit this group for other reasons than being released or transferred, it is not known how many left because of injury versus the other reported reason, a lack of interest. Similar findings were reported by Pollock et al. (1977). The rate of injury for the 45 minute duration group and 5 days per week group was more than twice the rate of their respective counterparts (54% and 39%, respectively). At the completion of the study, more subjects in the duration group suffered from injuries than in the frequency group (19 to 8, respectively). The 45 minute duration group seemed the most affected by injuries. Sixteen percent dropped out because of injury ($p < .01$ compared to control group; $p < .01$ compared to other experimental groups) compared to 4% in the 3 days per week group and 5.6% in the 5 days per week group (other groups reported none). As would be expected, the leg was the most common site of injury with shin splints and knee problems being first and second. It is interesting to note that the subjects in both of these last two studies were relatively young (ages 20 to 35 years) and were considered healthy. Yet injury was a real problem for these subjects.

In each study reviewed here, injury and soreness affected both attendance and attrition, along with causing discomfort to those involved. In general, injuries were a problem for beginners, for those who started exercise at too great an intensity for their condition, for those who exercise often and for the longest duration and for those

whose main exercise was jogging. Muscle and joint soreness, as well as fatigue, should be expected as normally sedentary individuals begin physical activity. However, in the organization of a program and its routine, it is necessary to consider all factors which influence injuries, positively or negatively, and the consequences in terms of continuing activity.

It would seem logical that if fitting an exercise program into one's schedule were an anticipated problem, it would have been resolved before one actually began a program. In other words, once a person begins the program, thus making a commitment to participate, time should have been found and designated for this endeavor. This is apparently not always the case, for a reported cause of attrition among people who have begun an exercise program was conflicts with personal or work schedules. Scheduling problems seem to arise for several reasons. First, organized programs have set hours for participation, that is, they are not completely flexible. Most of the programs reviewed here offered at least two times for training (Harris et al., 1967; Mann et al., 1969) and one offered four choices of times for training during the day (Oja et al., 1974). The former studies reported complaints about the hours of training, although Oja et al. had only one subject drop out because of scheduling problems, and that was, apparently, caused by a change in the subject's work schedule. The additional time offerings, as well as a choice of the type of exercise regimen that the subjects had could well have had a positive influence on adherence. If subjects found that they could not continue training at the designated hours, they dropped the program. Individuals who

pursue physical activity on their own, obviously are not confined to certain hours, certain days of the week unless they use a facility which is only accessible at certain times.

Second, fitting exercise in one's schedule is a problem if one lacks the time for such an endeavor. Thirty-two of the 98 dropouts in Harris et al.'s (1967) study claimed that this was the reason for their departure. Brunner's (1969) results were based on interviews which he conducted with 60 adult men; 30 men classified as participants (exercise regularly 3 times per week) and 30 nonparticipants (exercise less than 3 times per week and sporatically). He reported the nonparticipants often stated that they were "too busy" with business concerns to participate in regular activity. Dropouts from Mann et al.'s (1969) study listed as one of their major objections to the program "infringement on personal and family time" (p. 17). Subjects in the unsupervised exercise group in Gettman, Pollock and Ward's study (1983) stated that "the program took too much time and interfered with their jobs and family life" (p. 59). Dropouts from the supervised program similarly reported the great amount of time involved was prohibitive to their continuing. These statements indicated the unwillingness of people to give up time for physical activity. This attitude may well be more prevalent than the research reveals. Most people do have some time to spare in their daily or weekly schedule. The question really is whether people are willing to use their spare time for physical activity. Published research does not give much attention to this matter.

Several studies lost subjects because of a reported "lack of interest" (Oja et al., 1974; Gettman et al., 1976; Pollock et al., 1977; Gettman, Pollock and Ward, 1983). It might be speculated that some of those who claimed they lacked time, they really lacked the interest to continue activity (Gettman, Pollock and Ward, 1983), and that factors which improve motivation would be useful for both these groups.

Attrition from organized programs is also affected by the type of exercises which are offered or the organization of such programs. An aversive program, that is, boring, too strenuous, unenjoyable, unorganized, will likely be dropped. If the regimen is perceived as moderate but still challenging, fun, relaxing, and well organized, chances are much better that it will be continued (Franklin, 1978; Oldridge, 1977). Dropouts from Mann et al.'s (1969) study cited the monotony of the program as one objection they had. The program consisted of calisthenics and walking/jogging at different intensity levels. Hanson (1976) interviewed the colleagues of dropouts from a university-sponsored exercise program in order to find out what objections the dropouts had expressed to others about the program and why they had quit. Several reasons relating to dislike of the program were cited, specifically, "dissatisfaction with the program because it resembled high school gym classes, was too rigid, provided no competitive challenge" (p. 17). It is not known to what extent these objections were felt. Massie and Shephard (1971) speculated that boredom and adverse weather conditions were problems with subjects in their I group, especially those who chose running exclusively to earn points in Cooper's Aerobics system. Oja et al. (1974) tried to individualize

their program by offering different regimens to their volunteer subjects and they had success in retaining most of their subjects throughout the study. Sime et al.'s (1976) program involved bicycle ergometer training only and suffered from high attrition (the authors did not secure any information from the dropouts as to the cause of their not completing the program).

A few other causes for dropping out of exercise programs have been reported. A change of residence is, of course, one which cannot be controlled, but it was not a serious problem in the studies reviewed here. Very few cases were reported in two studies (Harris et al., 1967; Oja et al., 1974), and it was mentioned as a cause for attrition in another but no specifics were given (Hanson, 1976). Obviously, individual exercise programs would not necessarily be affected by a move (unless a partner for a dual sport was necessary). Several studies also lost subjects due to other illnesses or medical problems of their own or their families (Oja et al., 1974; Harris et al., 1967; Hanson, 1976; Gettman, Pollock and Ward, 1983). Non-exercise related health problems which will temporarily interfere with training are to be expected. Motivated people will likely resume their activity after recovery.

Finally Harris et al. (1967) reported that several subjects quit because they were discouraged with their progress. It will, of course, take sedentary persons some time to condition themselves enough to begin to see gains. Subjects who understand this, who are patient with themselves, and who derive other satisfactions from training should continue until progress is achieved.

Reasons for beginning exercise. It has been suggested that motives for beginning an exercise program differ from motives for adhering to one (Heinzelmann and Bagley, 1970). Although the main focus of this paper is long term adherence, it is interesting to note factors which influence people to participate initially. Subjects in the present study were asked to give their reasons for participation in a physical activity program. By comparing early motives with motives for continuing, one might be better able to formulate techniques which encourage compliance at both points (beginning and long-term adherence).

Heinzelmann and Bagley (1970) asked 159 of those who volunteered to participate in their study to indicate why they were willing to participate. The reasons given were then summarized and compiled into a list. At the start of the program, the men were asked to review the list and rank order the reasons according to their influence on participation. Most important were: (1) a desire to feel better and healthier; (2) interest in lessening the risk of heart attack; and (3) desire to help in medical research (obviously it was known to the subjects that this was part of a research project). Of moderate importance was a desire to gain health knowledge, engage in recreation and change their regular schedule. For the most part, these subjects had been influenced by what they believe to be medical benefits of exercise. That physical activity could be recreational, pleasurable or fun were only secondary considerations. However, the men recruited for this study were middle-aged and sedentary, who were found to have certain risk factors associated with CHD (high BP readings and cholesterol

levels). Their orientation would logically be a medical/health one. The complete list of reasons from which they chose was not available.

Likewise, the subjects in the Wisconsin project who were followed up by Hanson (1976) were those men with multiple risk factors for CHD. Hanson reported the reasons given by the men who accepted the invitation to participate were: (1) excellent facilities which were close to their offices; (2) training times which fit into their schedules; (3) concern for losing fitness and its effect on participation in activities with their families; and (4) the hope that an organized program would lead to adherence, having failed to continue regular activity on their own. These subjects offered more practical reasons for beginning regular exercise. The manner of collecting the data differed from Heinzelmann and Bagley (1970), that is, these subjects had no formal list from which to choose, rather the reasons given were self-expressed (open-ended question). It appeared that although the profiles of subjects were similar in both studies (Heinzelmann and Bagley, 1970; Hanson, 1976), the motives for beginning differed, or at least were expressed differently.

Teraslinna, Partanen, Oja and Koskela (1970) used a questionnaire to determine the motives, by order of importance, of those willing to participate in an organized exercise program. The choices given were: (1) improve health; (2) control weight; (3) improve physical fitness; (4) improve work capacity; (5) gain recreation and change; (6) because the program was conducted and supervised; and (7) because of some other reason. Sixty-three percent of those who answered the questionnaire cited "improvement of health" as the primary reason. The next most

important reason was "improvement of physical fitness." As with Heinzelmann and Bagley (1970), this was a forced choice questionnaire and subjects' responses were similar in both studies. Teraslinna et al. (1970) were also interested in differentiating between those who were willing to participate and those who were not on the following factors: (1) distance between residence and exercise facility; (2) reported dissatisfaction with work and family; (3) insufficiency of sleep, leisure time, and physical activity; (4) reported number of evenings spent away from home per week; (5) reported frequency of present physical activity; (6) reported consumption of alcohol and use of drugs; and (7) reported smoking. Seven hundred eighty-six men responded. The authors reported that three variables discriminated between willing and unwilling subjects ($p < .001$): (1) distance between residence and facility, (2) reported insufficiency of physical activity, and (3) reported frequency of present physical activity. It seemed that those who lived the closest, engaged in activity more frequently but believed the amount to be insufficient were more likely to participate. Also reported was a difference between those willing and the unwilling in terms of frequency of smoking. Although the authors concluded that the willing group smoked more frequently, the direction of the difference appeared unclear. The data were presented in line graph form, and presented a comparison of percent of responses of the willing and unwilling by age on four factors (smokers, sufficient physical activity, residence near the facility and no regular activity). Regarding frequency of smoking, willing participants were a greater percent of smokers (but apparently not significantly more) until age 55 to 59 at

which time the unwilling become more frequent smokers. Yet, these data (the lines are not far apart; maximum of 23% difference at below 39 years, to less than 10% difference at ages 40 to 44, 50 to 54, 55 to 59 and over 60 years) were reported as being significantly different at $p < .01$. A close look at graphs for "sufficient physical activity" and "residence near the institute" appeared as confusing. The graph of the former variable showed significant differences between groups at age 45 to 49 years only ($p < .01$) and at age 50 to 54 there is no difference in reported sufficiency of physical activity, yet overall the authors reported significant difference at $p < .001$. The graph of the latter variable showed men ages 45 to 49 years were different by groups ($p < .001$) but there was less than 10% difference between the groups at other ages, specifically, under 39, 40 to 44 and over 60; and at age 55 to 59 years the unwilling group actually surpassed the willing group (more of the unwilling live closer to the facility) yet overall the groups were different at $p < .05$. It might be suggested that some factor has influenced the computation of statistical significance for very small real differences (perhaps the large N). Without additional information on this study and similar investigations on characteristics of willing versus unwilling participants in exercise programs, these conclusions should be accepted with caution.

The literature has little information on why people begin exercise programs, and the responses reported seem to differ dramatically depending on the techniques used for securing the information. One thing is certain, techniques for increasing motivation to adhere are useless unless people are willing to begin. Determining the real reasons

for beginning a regimen is the first step in influencing participation, and those reasons may differ from the ones which cause adherence, as will be explored next.

Reasons for adherence. The most frequently reported reasons for people adhering to a physical activity program related to health and fitness concerns (Mann et al., 1969; Brunner, 1969; Heinzelmann and Bagley, 1970; and Hanson, 1976). These concerns were expressed in different ways, for example, improvement in physical fitness, weight control, a desire to feel better both physically and mentally, improvement of overall health status, decrease risk of heart problems. Hanson (1976) reported that all of the men still participating in the exercise program after 7 years agreed that the activity made them feel better, specifically, it "increased their stamina, relieved tension, was mentally relaxing, made them less fearful about their health, and enabled them to sleep better" (p. 88). Brunner (1969) reported similar findings. He asked his subjects to indicate how exercise was personally beneficial to them. Nine of the top 10 responses were factors relating to physical or mental health, for example, keep physically fit, feel better physically and mentally, relax the mind from the day's vocation, improve health, keep mentally alert, sleep better.

The benefits expressed by the subjects in both studies (Hanson, 1976; Brunner, 1969) have not been measured under controlled research conditions. They are simply changes a person detects about his/her everyday living patterns, expressed in common terms or phrases. They are obviously viewed as positive results of activity and, therefore,

are influential in keeping these subjects involved. Certainly the meaning and intensity of these feelings are different among people, however, there does seem to be a genuinely positive feeling resulting from activity for many regular exercisers.

Roth (1974) gathered data from 30 regular exercisers, aged 30 to 50 years, through informal interviews. He conceded that the sample was not representative of the general population, but that they were a group who would likely benefit from regular exercise, and be recruited for an exercise program (based on age, socioeconomic status, and CHD risk). He reduced his data into four general "motivational themes." One was a "desire for health and fear of death" (p. 42). These subjects seemed to know the medical aspects of exercise and believed that they could enhance their health through regular activity. This knowledge was a motivating factor in itself. A second theme identified by Roth was, "physical pleasure and pain." The majority of this sample apparently was not discouraged by the physical stress of exercise (only four stating it was unpleasant from this aspect). In fact, the majority reported that following activity they had increased feelings of well-being, release from tension, felt less tired, and felt calmer (similar to Heinzelmann and Bagley's, 1970, and Hanson's, 1976, studies).

Further information was available but in less specific terms. Over one-half of the subjects who completed Mann et al.'s (1969) program indicated that they had participated because of their health. No interpretation of that was provided, as this information was secured in a multiple-choice type questionnaire. Other choices beside "health" were: fitness, to accommodate us (researchers), or combinations of

choices. When asked at the end of the study which aspect of the program influenced them to continue, subjects in Heinzelmann and Bagley's (1970) study reported health and fitness benefits as one, although it was fifth on the list and only 14% of the respondents chose it. These subjects seemed more influenced by the features of the program itself rather than very personal benefits (other features will be discussed later). One possible reason for this was the wording of the question, that is, what features did the subject like best about the program. The aspects of the program may have better answered that particular question but not exactly answer the question of what influenced the subjects to participate.

Several authors have contended that exercise with a group encourages adherence (Pollock et al., 1977; Hoepfel-Harris, 1980; Franklin, 1978). Group activity has been espoused as providing the opportunity to make new acquaintances and benefiting from mutual encouragement. Further it has been stated that group programs arouse a sense of commitment to maintain the group (Hanson, 1976; Roth, 1974). These ideas have been expressed by participants in the studies reviewed here. Hanson's (1976) group expressed three views regarding the social aspects of exercise programs: (1) many men made acquaintances outside their own circle thus broadening their social contacts; (2) many felt an obligation to the group and could not quit easily; and (3) there was pressure applied by other members to continue, specifically, friendly "needling" if a day was missed. Some subjects revealed that it took real self-discipline to continue regular activity and that support of the group was crucial in their ability to maintain that

needed discipline. Twenty-six percent of the subjects in Heinzelmann and Bagley's (1970) study reported the social aspects the "best liked feature" of the program. This is of particular interest since social factors were reported as least influential at the beginning of the study, when these subjects agreed to participate. The experience of group involvement actually played a bigger role than the people thought it would. And finally, Massie and Shephard (1971) speculated that adherence was much better in the Y group because of the social atmosphere and mutual encouragement. It must also be recognized that each member of the Y group paid a fee (\$60.00) in order to participate in this program. The relative weight of these two motives was not determined.

The social feature of group programs certainly has influenced in maintaining some participants. However, this feature is not important to everyone. Hanson (1976) reported that one reason cited for refusing an invitation to participate in an activity program was a preference for exercising alone. Two subjects interviewed by Roth (1974) preferred solitary exercise. Gettman, Pollock and Ward (1983) found that the supervised exercise group which had the benefit of an exercise leader, more frequent monitoring of physiological changes and group support had a greater dropout rate than did the group left somewhat on their own. They suggested that the time and effort it takes to travel to the exercise program site may be more prohibitive to continuing than having group support is influential.

Several other reasons were cited as factors which encouraged adherence. Subjects in two studies stated that the recreational aspect

of exercise was important. In a ranked list of perceived personal benefits of exercise, subjects ranked the fun and enjoyment of activity as number three (Brunner, 1969). Twenty-nine percent of subjects in Heinzelmann and Bagley's (1970) study reported the recreational aspect of their program as one of the best features. These two studies differed slightly in the other reasons given, the former oriented more toward features of the program, the latter oriented more towards personal benefits, but both included the fun aspect of activity. As has been alluded to previously, an influential factor for adherence cited by most of the respondents in Heinzelmann and Bagley's (1970) study was the organization of the program itself. They also reported that a wife's attitude related to the adherence pattern of the husband. Of the wives who had a positive attitude towards the program, 80% of their husbands had excellent or good adherence patterns. When wives' attitudes were neutral or negative, only 40% of the husbands had excellent or good adherence patterns. The authors concluded that attention should be given to "significant others" because of their influence over a person's participation in regular activity.

Roth (1974) offered another reason for people engaging in regular activity. Most in his study felt that the decision to exercise regularly was a rational one, therefore, being able to "stick with it" was a personal accomplishment. They viewed themselves as having active control in "overcoming feelings of inertia." Apparently, they valued the discipline it took to continue participation. Some of the respondents to Heinzelmann and Bagley's (1970) questionnaire also

expressed the "feeling of accomplishment" as a positive feature of an exercise program.

Information on the motives for keeping people physically active is scant. Formal measurement of a very complex area is difficult, at best, so informal interviews or questionnaires have been used extensively. This leaves open the question of the validity and reliability of the information and does not assess the relative weight of motivational factors in an individual or between individuals. Therefore, these data cannot be accepted as proof of cause-effect, for example, the cause of a person adhering to an exercise regimen is that the activity made them more relaxed during the rest of the day. However, these perceived benefits cannot be dismissed as meaningless just because they have not been scientifically scrutinized. They should be recognized as motivational factors and, as such, aspects that should be explored with beginning exercisers to influence their continued participation.

Cardiac Rehabilitation Programs

With few exceptions, adherence to exercise programs in groups of cardiac patients does not appear to be much different, or better, than for normals. This is surprising since the motivation to comply with all prescriptions aimed at preventing death and enhancing recovery, should be paramount in this group. The notion of susceptibility to disease, specifically CHD, is no longer abstract. These people have suffered some coronary damage and the majority require rehabilitation in order to regain loss of functioning. Their motivation to engage in

regular activity as part of their rehabilitation prescription although expected to be high, is apparently lacking. The studies on cardiovascular rehabilitation programs are reviewed in descending order of reported rates of adherence, that is, from highest to lowest (Table 2.2).

In an attempt to compare exercise with relaxation therapy, in terms of affecting the course of coronary disease, Kavanagh, Shephard, Doney and Pandit (1973) studied white collar executive cardiac patients involved in either a physical activity program or hypnotherapy over a 24 month period. The exercise group met for a supervised session once per week for 1½ hours and were expected to engage in four additional workouts each week on their own. Each subject kept a diary and monitored their progress using Cooper's (1968) point system. The hypnotherapy group also met once per week to practice eye-fixation trance, deep breathing and other techniques for relief of anxiety, depression and tension. They were encouraged to practice these relaxation techniques at home but were prohibited from exercise.

A modified random selection process was used to assign 38 patients to the exercise program and 18 to the hypnotherapy group (it was not possible to accommodate a large number in the therapy group). The authors reported an adherence rate of 83% during the "practical part of the study" but acknowledged that test data was obtained on a smaller sample. No detailed explanation was given except that not all patients completed the test. It was further reported that attendance averaged 85% in the exercise group and 74% in the hypnotherapy group. Of reported reasons for dropping out, three were medical and the

TABLE 2.2

REPORTED RATES OF ADHERENCE FOR CARDIAC REHABILITATION
PROGRAMS BY PERCENT AND LENGTH OF THE PROGRAM

Cardiac Rehabilitation Programs				
Author(s)	Subjects	Length	% Adherence	% Attrition
Kavanagh et al. (1973)	56 men	24 months	83%	17%
Hellerstein (1968)	100 men	36 months	75%	25%
Oldridge et al. (1978)	153 men	12 months	57%	43%
		24 months	42%	58%
		36 months	34%	66%
Bruce et al. (1976)	547 men	12 months	54% M; 42% F ¹	46% M; 58% F
	56 women	36 months	30%	70%
Carmody et al. (1980)	203 patients 94% M 6% F	12 months	48.3%	51.7%
		24 months	33.5%	66.5%
		36 months	28.6%	71.4%
		40 months	18.7%	81.3%
Wilhelmsen et al. (1975)	112 Patients	12 months	36% ² ; 60% ³	64%; 40%
		24 months	28% ² ; 50% ³	72%; 50%
		36 months	19% ² ; 41% ³	81%; 59%
Kentala (1972)	141 Patients	5 months	40% ⁴	60%
		12 months	14%	86%

¹M = males; F = females.

²Hospital based programs.

³Included independent exercisers (Wilhelmsen et al., 1975, Figure 1, p. 498).

⁴Not confirmed.

majority of the others were "pressure of business." Other than the groups developing "a fine spirit of camaraderie," the authors did not speculate on factors which may have produced a high adherence rate.

Hellerstein (1968) also reported a high adherence rate in a conditioning program, specifically, 75% over approximately 36 months. The subjects were 100 middle-aged upper class males diagnosed as having CHD who began an exercise program, consisting of calisthenics, a run-walk bout and recreational games. The men worked at 60% to 70% of their oxygen uptake capacity. Subjects also received advice on proper diet and encouragement to abstain from smoking. A panel of judges determined adherence from patients' performance cards. The researchers then compared improvements based on attendance and found patients who averaged 2.2 to 3 times per week made greater gains. The criteria for being considered an adherer (and part of the 75% reported rate) was not made clear. In other words, it is not known how many sessions over the 36 months a subject had to attend to be counted as a regular participant.

Oldridge, Wicks, Hanley, Sutton and Jones (1978) used four general categories to group dropouts: unavoidable, psychosocial (lack of interest or motivation, personal problems), medical reasons, and unknown, to give a profile of the dropouts from a 4 year cardiac rehabilitation program in Ontario from January, 1973 to October, 1976. One hundred sixty-three men who had suffered a myocardial infarction (MI) were assigned to either a high intensity exercise group (HIE) or a low intensity exercise group (LIE). The HIE group met twice a week for 45 to 70 minutes for endurance type activities and were expected to exercise an

additional 2 times per week on their own and record their activities. The LIE group met once a week for relaxation and recreational activities (for example, bowling, yoga) and were to continue recreational activities during their leisure time. Noncompliers were those who failed to attend for more than 8 weeks, excluding those who died or suffered another MI. Of the 153 possible participants (eliminated from the analysis were two because of death and eight who suffered a second MI), 57% were still attending at the end of 12 months. Of the noncompliers (N = 65), 46% dropped out within one month. Attendance rates were similar for both groups: 68% HIEs and 74% LIEs.

The most common reason given for dropping out was a lack of motivation and interest, that is, psychosocial reasons (30%), followed by unavoidable reasons (24%) and medical reasons (11%). No unknown reasons were reported. It is interesting to note that almost twice as many patients in the LIE group left prior to one month than those in the HIE group (11% and 6%, respectively). The authors suggested a more negative attitude toward relaxation and recreational activities than the more strenuous type (perhaps boredom?). At 12 months there seemed to be no difference between groups in reasons given for dropping out. The patients did not tend to remain in the "easier" program more often than the more strenuous program once a lifestyle change was made. The subjects were followed up again at years two and three and compliance had dropped to approximately 42% and 34% in the HIE and LIE groups respectively. It must be noted that these subjects were recruited for the study and did not volunteer. This may give a more realistic picture of cardiac patients' responses to exercise as part of their rehabilitation, but it makes it difficult to compare these rates

directly with other studies. Sixty percent of all those who left the program attended no more than one session. The authors suggested that for a large number there was no real commitment made to the exercise program at the beginning.

The most interesting aspect of this study was the differences found between compliers and early noncompliers on behavioral factors. The early noncompliers were more likely to have had more than one previous MI ($p < .01$); a Type A personality ($p < .01$); be more inactive in leisure time ($p < .01$); and be smokers ($p < .05$). The authors stated in the text that there were no differences in these characteristics between compliers and late noncompliers, however, the table (Oldridge, 1978, p. 363) showed significant differences in number of previous MIs ($p < .05$), Type A personalities ($p < .01$) and inactivity in leisure time ($p < .05$), with late noncompliers having the characteristics more often. It is obvious that these data showed that the person who is most susceptible to another MI is more likely to be a noncomplier. The authors suggested that these two regimens may have been complex enough to discourage adherence. The exercise group had to engage in independent activity at a specified level and the hypnotherapy group had to learn relaxation techniques. This article did not include comparisons of HIE and LIE groups in clinical and psychosocial characteristics. Comparisons were made between compliers and noncompliers only.

Bruce, Frederick, Bruce and Fisher (1976) monitored the progress of 547 men and 56 women, all of whom had either angina, an MI or both, in Cardiopulmonary Research Institute (CAPRI) community programs for cardiopulmonary rehabilitation. Training sessions were held 3 times

a week for 30 to 60 minutes each session. Exercises consisted of graded walking, calisthenics, and, when feasible, jogging. Data were collected from May, 1968 to April, 1974 from patient records and a follow-up health questionnaire. The following information was obtained from the records: date of enrollment; clinical reasons for enrollment; physical characteristics; measures at near maximal exercise testing of HR, SBP and pressure-rate product; number and dates of cardiac problems and diagnostic and therapeutic procedures followed; participation status; reasons for and dates of dropping out; and dates and causes of illness or death. The questionnaire ascertained working status and illness information, as well as information on physical activity of the dropout group. It was found that all but 6 patients completed the basic 3 month program. However, after one year only 54% of the males and 42% of the females were still active in CAPRI. After 3 years, less than 30% of all initial enrollees were still active in the program. Using 12 sessions per month as standard, attendance averaged 68% of the total number of sessions scheduled for active males and 71% for active females during the length of the study. Dropout men and women attended an average of 70 and 88%, respectively, during the time they were active. Of the dropouts, 38% of males and 40% of the females reported engaging in activity on their own. The most frequently reported activity was walking, the intensity of which was not reported. The authors reported a significant difference ($p < .001$) between the active and dropout groups in amount of participation in the training program, that is, the number of sessions attended and duration of each session. Possibly due to this, active men

achieved higher levels of fitness than the dropouts. It did not appear, however, that the better fit or well people were the ones who remained active in the program. Actives and dropouts were comparable on baseline data measurements, that is, medical problem/diagnosis of CVD, age, weight, and stress test results (max HR, SBP, left ventricle impairment). There was no statistical difference in CV mortality between groups, however, there were 36 deaths in the dropout group to 16 in the active. There were no differences between groups in the number of cardiac arrests, however, the average time to the event was significantly shorter for the dropout group.

The reasons most frequently given for dropping out of the formal program were designated socioeconomic, for example, conflict in work schedule, insufficient financial resources and change in residence. Thirty-four percent of the males and 44% of the females gave reasons which fell into these categories. Other reasons given by men and women respectively were: medical (21% and 14%), personal (4% and 11%), miscellaneous (11% and 17%), unknown (18% and 9%) and not motivated (19% and 6%). The lack of definition for the categories "miscellaneous" and "personal," as well as, the percentage of "unknowns" creates difficulty in formulating any conclusive statement about excuses for nonadherence or in recommending interventions to increase the rate of adherence. Bruce et al. (1976) also looked at working status by groups. The majority of active men (62%) and dropout women (51%) were working full time, compared to 19% of active women and 35% of dropout men. However, except for active men, the "unknown" category was quite

large (24%, 41% and 31%, active women, dropout men and dropout women, respectively). This makes comparisons of active to dropout difficult.

In order to examine dropout rates in a cardiac rehabilitation program beyond 3 years to clarify long-term compliance, Carmody, Senner, Malinow and Matarazzo (1980) followed 203 cardiac patients for 40 months. Subjects had enrolled in Cardiac Therapy Program involving three, one hour sessions per week, including warm-up and cool down periods. Participants were encouraged to work at 85% of max HR, unless cardiac-related symptoms occurred and staff were available for close supervision. Reported in 4 month intervals, the greatest dropout of participants occurred in the first 4 months (30%). There continued to be a decline of patients, and at 40 months only 38 patients (18.7%) were still participating in the exercise program. The authors suggested that identification of factors which contribute to noncompliance in the earliest phase should be determined so that appropriate strategies can be initiated from the start of the rehabilitation program.

Wilhelmsen, Sanne, Elmfeldt, Grimby, Tibblin and Wedel (1975) were interested in determining whether physical training could alter the death rate and nonfatal reinfarction rate in post infarct patients. Patients who were hospitalized for MI's during 1968 to 1970 were randomly assigned to either a training or control group. The training program was started 3 months after the MI by 112 patients, 105 in the hospital-based program and seven independently. The hospital program could be scheduled at any time during the normal working day at a cost of approximately \$35.00. It involved calisthenics, cycling and running

at an individually assigned intensity. One year later only 39% of those who started were still attending the hospital program. Twenty-one percent were reported to be exercising at home or at work (no intensities, durations or frequencies for the independent programs were given). Only 8 patients dropped out for medical reasons. The reasons most often reported were "practical difficulties and poor cooperation" (p. 497). Eighty-one percent of the available opportunities were utilized at first. By the end of 9 months only 63% of the available sessions were utilized.

Rate of adherence continued to drop over the next 2 years, to 28% and 19% respectively. If the independent exercisers are included in the rates, at the end of 24 months approximately 50% were engaged in some physical activity and 41% at the end of 36 months. It is difficult to determine if the dropout rates included those who died during the year, or were based on the surviving patients only. The authors believed that the high dropout rate was a "serious drawback" in detecting effects of the training, that is, greater differences might have been seen if the N had remained more stable.

Of the studies reviewed, Kentala (1972) reported the lowest adherence rates for cardiac patients in a rehabilitation program. He randomly assigned cardiac patients to either an exercise or control group. Only 29 of 72 (40%) of the exercise group participated adequately through 5 months. At the end of one year only 10 (14%) were attending the hospital based program. Sixteen of the 43 dropouts reported maintaining a program on their own (37%). But 11 of the 69 controls had also increased their activity (16%). The author suggested

that there seemed to be a loss of motivation to continue a rehabilitation exercise program after leaving the hospital and as time from the MI increases.

Summary. As seen in Table 2.2 (p. 45), reported adherence rates for cardiac patients in rehabilitation programs vary greatly. The majority, however, are less than 60%, especially after one year. For a group who should be highly motivated to adopt lifestyle habits which have been shown to be beneficial in combating the effects of CHD, these rates are surprising. Whenever statistics alone are reviewed it is necessary to remember that studies vary in their protocol, subjects and time used for gathering the data. Generalizations should be made cautiously.

Several authors have suggested that dropout rates affect the results which are reported from studies concerning the benefits of exercise for the cardiac patient (Wilhelmsen et al., 1975; Bruce et al., 1976). It has also been suggested that if the probable dropout can be identified early, intervention measures may be implemented which could affect his/her attendance (Oldridge et al., 1978).

Motivation

Introduction. Motivation is a key element in behavior. However, there are different theories in psychology as to the mechanisms of motivation. It is not the intent of this paper to examine each view and judge its validity but rather to discuss common ideas, and problems in identifying the role of motivation in behavior. By necessity, then, the discussion will deal in broad generalities. Cofer and Appley (1964) identified three factors which contribute to

behavior: (1) "environmental determinant" (p. 5), that is, some force which calls for and leads to action; (2) an internal "urge, wish, feeling, emotion, drive, instinct, want, desire, demand, purpose, interest, aspiration, plan, need, or motive" (p. 5) which initiates action; or (3) the "incentive, goal or object value" which creates either a positive or negative reaction in an individual (p. 5). For certain events (factor one) the resultant action may be fairly straightforward, however, the same event will not be perceived as warranting action by everyone. Impetus for action which comes from an internal source (factors two and three) are much more difficult to understand and have led to varying explanations. Suffice it to say that "motives may be seen as energy arising from unfulfillment and directed toward gratification" (Cofer and Appley, 1964, p. 6). Regardless of the mechanism or process, every individual's behavior is directed and regulated by certain drives or forces. Motives are quite permanent and rather resistant to change (Caplan et al., 1976). Outside influences on such basic forces may be of little consequence, however, what can be influenced is the activity chosen to fulfill an already existing motive. In other words, if an individual is predisposed to value something, the method he/she chooses to deal with it may be affected.

Like any other behavior, health behavior depends upon motivational factors which determine whether action is taken.

People who are unconcerned with a particular aspect of their health are not likely to perceive any material that bears on that aspect of their health. Even if, through accidental circumstances, they do perceive such material, they will fail to learn, accept or use the information. (Rosenstock, 1966, p. 98)

With good health being so important to being able to conduct daily activity, it is difficult to understand why people are not receptive to adopting all behaviors which will sustain good health. A model which attempted to explain health behavior, specifically preventive health behavior, and various influencing factors has been widely scrutinized (Rosenstock, 1966; Rosenstock, 1974; Becker, Maiman, Kirscht, Haefner, Drachman, and Taylor, 1979). The Health Belief Model (HBM) was originally conceived by behavioral scientists in the Public Health Service (Becker et al., 1979), and is based on the concept that "health behavior is a function of a health motive or threat and the individual's beliefs about various courses of action open to him" (Rosenstock, 1960, p. 297). The difference between health motive and health threat needs clarification. Motives in the health area have been described as positive, that is, something pleasant to be attained (fitness); or negative, that is, an undesirable consequence to be avoided (illness) (Rosenstock, 1960). Health motive refers to the former category, while health threat refers to the latter. Rosenstock (1960) suggested that too often what is expressed as health motive really is based on an underlying threatening situation that needs to be avoided.

The model is based on two variables: (1) a person's readiness to act; and (2) the extent that this action will be beneficial (Rosenstock, 1966). More specifically, one's readiness depends on the level of perceived susceptibility to a condition, perceived severity if the condition occurs, whether any action can reduce or prevent the susceptibility and severity of the condition, presence of

factors (physical, financial, psychological) that are barriers to carrying out appropriate actions and presence of cues which stimulate action (Becker et al., 1979; Rosenstock, 1966). The perception of one's susceptibility to and seriousness of a condition has cognitive and emotional aspects. Regardless of what statistical probability might show, if a person "does not really believe it will happen to him" (Rosenstock, 1966, p. 99), countermeasures to avoid a condition will not be taken. The need for action does not exist for that individual. Similarly, perceived seriousness of a disease may be based on clinical consequences, that is, resulting pain, discomfort, death or emotional considerations, for example, effects on family, job, or both. If contracting the condition does not pose any significant problems, action to avoid the condition will not be taken. The next two factors (benefits and barriers to taking action) counterbalance each other. An individual must first believe that the action available will be effective in removing the threat of ill-health. If an individual does not believe it will work, then action will not be taken. On the other hand, if the action is unpleasant, expensive, uncomfortable, or inconvenient, then even though it is believed to have worth, action will not be taken. There is a conflict between doing what one knows will be helpful with what is aversive to do. When both readiness to act and barriers to the action are great, the conflict is much more intense and difficult to resolve. It may result in an increase in fear or anxiety resulting in irrational behavior or choosing an activity which the individual believes is a solution but in reality is not (Rosenstock, 1966). Finally, the HBM includes a factor designated "cue to action," which

is described as "some instigating event . . . to set the process in motion" (Rosenstock, 1966, p. 101). The intensity of the level of readiness or perceived benefits minus barriers may not be high enough to produce action except when some event triggers the behavior. These cues may be internal (body state) or external (for example, media message, interpersonal interaction, physician reminder or notice) (Rosenstock, 1966). Once some influence to action has been presented, the individual will act.

This model provides a feasible guide to explaining health behavior. Most studies which have tested this model as to its applicability reported supporting evidence (Rosenstock, 1974), with a few exceptions. The variables "perceived susceptibility," "benefits of action" and "cues to action" seemed to be the strongest factors in accounting for preventive behavior. In his review of the research, Rosenstock (1974) concluded that more research needs to be done, particularly on the following: (1) optimal levels of readiness required for action; (2) stability of beliefs over time; (3) reliability of the actual measures of beliefs; and (4) the role of the variable "perceived seriousness." Despite the questions that need to be addressed, this model appears to have potential for understanding motivation toward preventive health behavior. The ultimate aim, however, in even utilizing a theoretical model such as HBM is to determine how behavior can be modified. Rosenstock (1966) contended that at several points in the model, intervention strategies can be successfully employed. He specifically points out that reduction of barriers, maximization of convenience and

presentation of additional cues would be effective in prompting preventive health actions.

As has been previously discussed, regular physical activity is a preventive health behavior. Thus, the concepts of the HBM can be applied to adopting and maintaining a regular exercise program. Those individuals who perceive susceptibility to illnesses or conditions caused by inactivity, believe those conditions would seriously limit them, believe that exercise is effective in maintaining a level of fitness to counter the ill effects of inactivity, have access to information necessary to begin participation at adequate activity levels and are presented with some cue which arouses these beliefs and motives sufficiently enough to cause the individual to begin and continue regular exercise will take such action.

Intervention strategies have been suggested and are discussed in the following section.

Motivational techniques. A number of strategies espoused to increase motivation to adhere to a regular activity program have been discussed in the literature. Several authors believe education to be a vital part of any effort to affect adherence (Pollock et al., 1978; Brunner, 1969; Franklin, 1978; and Hoepfel-Harris, 1980). Pollock et al. (1978) stated, "one of the most important aspects of motivation is to have participants properly educated as to why regular exercise is an important component of their life-style" (p. 245). Franklin (1978) seemed to be as adamant about the importance of education but recognized that only knowing reasons why one should exercise was insufficient. Information on how they should exercise was also crucial.

He suggested the following be included in the instructional component: body mechanics, energy expenditure, cardiac function, exercise prescription, proper attire, affects environmental conditions may have on performance, and hazardous practices (p. 13). Hoepfel-Harris (1980) viewed education as one of three components essential to any intervention program (others being behavioral oriented techniques and a combination of both) but suggested that education alone is not that effective. According to Sackett (1976) educational approaches affected therapeutic outcomes approximately half the time, while behavioral strategies were most effective in changing behavior. To support the stand that education alone does not alter behavior, Morgan et al. (1970) offered the example that the information on the detrimental effects of smoking released from the Surgeon General's Office did not eliminate smoking in this country. Yet, he did not dismiss this component, only suggested that many people possess the necessary cognitive information and now require strategies which are effective in behavior change.

Several specific methods for including education as part of an exercise program were suggested (Franklin, 1978; Pollock et al., 1978). They were: (1) use of a bulletin board to display current literature related to fitness and training; (2) giving a mini lecture before the group exercises on different topics relating to fitness and training; (3) publishing a newsletter periodically with appropriate educational information; (4) holding group education meetings periodically conducted by the leader, or guest lecturers from relating fields (Franklin, 1978); (5) use of films, booklets, seminars or workshops (Pollock et al., 1978). Naughton and Hellerstein (1973) suggested that use of small

groups to discuss benefits and personal needs of exercise were most effective in maintaining adherence than the lecture to large group approach. He believed that active involvement through discussion versus passive reception of information would result in more opportunity to explore the demands of a regular exercise program and exertion of influence by others in the group which would lead to a firmer commitment.

Reid and Morgan (1979) compared the effect of a health education program with self-monitoring of progress in an exercise program. A group of firefighters (age 24 to 56) were assigned to one of three groups: (1) control; (2) health education (via a film and discussion on how and why to exercise); and (3) health education plus a monitoring system (using a point system and weekly point goals). Compliance to exercise was inferred by amount of change in aerobic condition from start, at 3 months and at 6 months and self-reports of activity. At 3 months, groups 2 and 3 combined had significantly more compliers than the control, but the effect did not continue through 6 months. There appeared no advantage to the self-monitoring system. In this case, an educational component was initially effective, but not enough to sustain adherence over a longer period of time.

Another motivating factor that has been espoused by several authors is to offer a variety of activities in order to reduce boredom which may result from engaging in the same activity for long periods of time and to add a fun or a recreational component to the program (Pollock et al., 1978; Hoepfel-Harris, 1980; Franklin, 1978; Oldridge, 1977). Jogging/running programs are not the only regimen which can produce cardiovascular fitness improvements (Pollock et al., 1978).

Most important is that people find an activity that they will adopt for a life time, that has benefit. Warm-up activities do not have to be exclusively calisthenics, but modified games can produce the same result, that is, stretching and flexibility movements (Franklin, 1978; Hoepfel-Harris, 1978). Finally, occasionally substituting a game for the conditioning part of the program will aid in keeping interest up and providing enjoyment (Oldridge, 1977; Franklin, 1978). Adding variety and fun to exercise regimens could result in better adherence. It has also been suggested that giving an individual some choice and control over activity selection may encourage attendance. Thompson and Wankel (1980) found significant differences in attendance rates by the fifth and sixth week between a group whose exercises were chosen for them and a group who perceived that their exercise program had been based on personal selection (by ranking) of particular exercises.

One of the primary reasons for not participating in regular exercise or dropping out of a program is a lack of time or inability to schedule activity in one's regular routine. To attack this problem three areas must be addressed: (1) the real time demands of becoming a physically active person (Roth, 1974; Naughton and Hellerstein, 1973); (2) the real importance one gives to exercise (Naughton and Hellerstein, 1973); and (3) regularity in scheduling workouts (Roth, 1974; Franklin, 1978; Pollock et al., 1978). Most of the dropouts in the studies reported in the literature occurred during the first part of the study. A realistic idea of the time commitment involved would result in a more objectively arrived at decision to begin. As discussed previously, this writer is convinced that the excuse of lack of time

often means a lack of interest, so exploration of the real desire to exercise should be made prior to beginning. Finally, regularity of workouts has been suggested as a countermeasure against "lack of time" excuse. A set time designated for activity is more likely to become a habit. Nothing else should be in conflict because that time has already been earmarked for activity.

No specific suggestion has been offered as an intervention strategy aimed at addressing these concerns, except by Naughton and Hellerstein (1973) who suggested small group discussion would provide the opportunity for exploration of the demands of participation. However, it is probable that most writers would agree that a realistic view of what a commitment to regular exercise means should be included in any written material on exercise and be addressed by exercise leaders at the beginning of an organized exercise program. In other words, an honest and realistic view of requirements of adopting a change in lifestyle, such as regular activity, needs to be included.

One approach which examines an individual's perception of the consequences of engaging in regular physical activity was introduced by Hoyt and Janis (1975). They used a decision-balance sheet procedure, involving an individual determining the advantages and disadvantages of regular attendance at a women's exercise class. Over a 7 week period, there was a significant increase in attendance for subjects using the decision-balance sheet procedure. This same procedure was used successfully to get a number of subjects back to a health club after a month's absence (Wankel and Thompson, 1977). The actual number, although significantly different from a control group, was low.

The authors suggested that additional motivational approaches were needed for long term maintenance of attendance.

Physiological testing is used as the primary way to determine the benefit one derives from exercise. The results of testing can be used by participants as a way of monitoring their progress (Hoepfel-Harris, 1980). Awareness of their accomplishments can be a real incentive to continuing (Pollock et al., 1978; Franklin, 1978; Katch and McArdle, 1977; Fardy, 1979). Although competition among group members should be avoided (Pollock et al., 1978), Franklin (1978) suggested that posting progress charts may be a source of incentive to work harder. Obviously, this may not work for everyone, for example, some individuals could become discouraged by the lack of what they perceive as reasonable progress. It may be important to convince beginners that small increases in fitness are to be expected and are quite acceptable.

Recordkeeping appears to be a successful motivational technique for some people, attested to by the popularity of Cooper's Aerobics system. Reid and Morgan (1979) found that self-monitoring was not more effective in increasing participation in regular physical activity than an educational method alone.

Another suggested method for increasing motivation for continuing activity is to adopt a reward system based on goal setting and achievement. Caplan et al. (1976) suggested that there are intrinsic and extrinsic rewards. In order that change of behavior be permanent, rewards for that behavior must be intrinsic. However, external reinforcers may be necessary initially. A reward system is a way to recognize achievement (Franklin, 1978) and provide goals to work towards. These

goals should be small ones because sedentary people and cardiac patients will only make small strides. "Reinforcers need to be delivered contingently and immediately following the desired behavior if possible" (Hoepfel-Harris, 1980, p. 450). The reward itself is not as important as the recognition of achievement.

In an unpublished paper (discussed in detail later), Martin and his colleagues (1982) found personalized feedback/praise reward enough to increase adherence to an exercise program.

In any organized program, those in position of leadership play a significant role in the success of an exercise program (Oldridge, 1977; Hoepfel-Harris, 1980). It follows then that adherence will be effected by the quality of the leadership and that improvement of it could serve as a motivational factor to improve adherence. Besides implementing the strategies discussed above in an effort to motivate continuation, Franklin (1978) noted that a leader's personal relations with group members is a powerful influence. Their sincere interest, enthusiasm, rapport and attention to each person will affect adherence.

Two techniques have been previously mentioned in this paper as providing incentives for adherence to exercise programs. First, group participation has been espoused by many (Pollock et al., 1978; Massie and Shephard, 1971; Franklin, 1978; Katch and McArdle, 1977; Fardy, 1979; Hoepfel-Harris, 1980). As previously discussed, it is said that mutual support and encouragement, comraderie, a social sharing atmosphere increases the possibility that one will continue long term activity. Second, based on Heinzelmann and Bagley's (1970) work, positive attitudes of significant others, especially spouses, can be a

source of motivation. It has been suggested that periodically those who are most influential to participants should be involved in the program (Franklin, 1978; Hoepfel-Harris, 1980; Fardy, 1979), for example, having periodic meetings or socials inviting these people.

Martin and Dubbert (1982) reviewed a number of unpublished studies (including several papers which were presented at various professional meetings, manuscripts in review or preparation, and an unpublished doctoral dissertation) which tested, "cognitive and behavioral strategies for improving exercise adherence" (p. 19). In P. A. Spevak's doctoral dissertation (1980), the maintenance intervention techniques applied (buddy system, booster sessions, phone calls, modeling and instruction which included significant others) resulted in greater exercise maintenance in college students through a 6 month follow-up. In a series of studies by Dubbert, Martin, Cohen, and Lake (1982 manuscript), using adult subjects in a running program, the following was found: (1) individual feedback and praise was more effective than group feedback, but distance and time-based goals were just as effective; (2) cognitive strategies using distraction ("pleasant, coping thoughts and small goals") resulted in greater attendance than focusing on bodily sensations and challenging goals; and (3) attendance lottery made no significant difference on attendance or adherence. Martin and Dubbert (1982) reported on papers by G. K. Goldrick (1979) and Lawson and colleagues (1980 and 1981) which found no more improvements when using self-management training than for fitness assessment or providing health information. No details were presented to explain the self-management training. The reviewers noted that there was a high rate of attrition

of subjects across all groups. Also noted by the reviewers was that most of these studies had limitations of small numbers of subjects, short period of times for data gathering and using indirect self-report measures to document adherence.

Summary. Suggested strategies to affect motivation for adherence to regular activity discussed were: (1) including an educational component in the program; (2) varying the activities; (3) allowing choice of activity; (4) dealing with time requirement and scheduling; (5) using decision-balance sheet; (6) keeping records of progress; (7) goal setting and implementing a reward system; (8) offering high quality leadership; (9) encouraging exercise with a group or partner; (10) involving and working with "significant others." Also mentioned were intervention techniques, behavioral oriented techniques, cognitive strategies of distraction versus a focus on bodily sensations, attendance lottery, and self-management training. Whether any of these strategies affect long term adherence is open to question because of a lack of evidence. Educational programs have been tested in other therapeutic programs with mixed results (Green, 1979). It seems that a knowledge base is a necessary component for compliance but alone does not guarantee it. Several studies dealing with adherence which were reviewed previously (Mann et al., 1969; Massie and Shephard, 1971) supported the idea that boredom from engaging in one type of activity exclusively may cause attrition, implying that a variation of activities would result in a higher rate of adherence. However, the results reported were not conclusive. They are based on only a few reports and the data is self-reported with no attempt to be scientific in its collection. Oja et

al.'s (1974) study did offer a variety of activities and their adherence was high, however, as previously discussed other factors were involved complicating the results. Additional testing of the positive effects of this strategy are indicated and may well prove significant. Another strategy suggestion based on the results of an experimental study was to involve significant others (Heinzelmann and Bagley, 1970). However, whether this attention will affect the attitudes of these people is not known. In other words, their influence on the participant has been shown, but whether anything can be done to affect their influence is not known.

Many writers have suggested that group participation is an advantage in terms of keeping one motivated to continue exercising. Experimental comparisons in terms of adherence in exercise programs have not been done. It appears, however, that support groups are advantageous, for example, Weight Watchers, Alcoholics Anonymous, in keeping individuals maintaining a certain behavior. There is no reason to believe that this type of support would not be effective for an exercise group. However, not everyone is able to participate in group activities. There may be time conflicts (Hanson, 1976), for participation in group programs does require devoting specific hours to that task. Furthermore, most organized groups require fees (for example, Hanson, 1976; Massie and Shephard, 1971). Not everyone is willing to pay to engage in activity when it can be had for free. So although group support may be beneficial, it is not available for everyone who wants to exercise regularly.

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The use of goal setting, feedback and reinforcement as motivational tools have been espoused as a desired teaching methodology in health education in general (Oberteuffer, Harrelson, and Pollock, 1972). Goals provide direction toward desired outcomes. They act as reference points for what needs to be accomplished. A basic purpose of evaluation is to provide students with information about their achievement, as a basis for motivation. Evaluation is often thought of in terms of grading, rating, etc., but utilized as feedback for the individual, it keeps that person aware of his/her progress. When gains are seen, motivation to continue and/or work harder should follow. Finally, the use of reinforcement for affecting behavior change has been advocated for a long time. Again, it has been used as a motivational tool in education (Fodor and Dalis, 1974, p. 56), for example, grading has always played a significant role in education and can be a reinforcer for quality academic work (Oberteuffer et al., 1972). Their effectiveness is dependent on an individual's perception of the worth of the task required for the reward and the relationship of it to the reward. All three of the aforementioned motivational techniques can be easily applied to an exercise program. In fact, some programs have incorporated these techniques in their programs (personal communication Melanie Holmes, Danny Martin). However, no organized study of the actual effect of these techniques has been done. They are being practiced, but apparently have not been tested.

Summary

The purpose of this chapter was to review the literature available and relevant to the topic of adherence to leisure time physical activity. Rates of adherence and attrition in exercise programs were reported to emphasize the problem of keeping apparently interested individuals in exercise programs. The possibility that some "dropouts" continue exercising on their own exists, but the extent is unknown. In order to understand the possible causes for low adherence rates, studies reporting reasons for discontinuing an exercise program were explored. Reasons presented varied tremendously. Some could probably be countered by an exercise program director while others are beyond their influence and would inevitably cause cessation of exercise.

An awareness of the motivation of people to engage in leisure time physical activity would be helpful in determining where encouragement and intervention is needed to maintain activity. Thus reasons reported in the literature regarding why people began exercising and reasons for their continued participation were reviewed. The reasons most often given were health and fitness related. If that concern was as strong as was indicated, no one would "drop-out." Obviously there are stronger influences that must be addressed by exercise program directors and individuals as they make a commitment to regular activity.

A high risk group for illnesses which may be influenced by inactivity are cardiac patients. If there is some factor which keeps their participation in activity high, it can be used with groups of healthy individuals, thus studies involving cardiac patients were

presented. Research shows that adherence in cardiac rehabilitation programs are just as poor as all-around exercise programs.

Basic premises of motivation were discussed, including the Health Belief Model and its use in explaining involvement in an activity such as exercise. Research done on the application of motivational techniques to affect adherence to leisure time physical activity were reviewed. Studies actually testing the techniques are scarce and relatively new (some yet unpublished), therefore, articles which discussed suggestions of intervention strategies to encourage participation were also included.

CHAPTER III

METHODS

Subjects

The subjects for the experimental groups in this study were 33 women who participated in certain exercise classes at the West Side Y.M.C.A. in Knoxville, Tennessee during Winter Session II. The session was 7 weeks in length, beginning February 23, 1981 and ending April 10, 1981. Participants in two beginning exercise classes were used, specifically, General Fitness I and Aerobic Dance. In order to account for any possible differences between women who enrolled in fitness versus dance classes, each treatment was assigned to subjects in both type of classes. The two treatments were assigned to the groups as follows:

Instruction treatment: General Fitness I, 8:30 to 9:30 a.m.,

Monday, Wednesday and Friday

Aerobic Dance, 10:30 to 11:30 a.m.,

Monday, Wednesday and Friday

Counseling treatment: General Fitness I, 5:45 to 6:30 p.m.,

Monday, Wednesday and Friday

Aerobic Dance, 11:00 to 12:00 a.m.,

Tuesday, Thursday and Friday

The Instruction group included 8 women in the fitness class and 7 in the dance class. Counseling groups were 2 and 16 women, respectively, in the two classes. Each class met 3 days per week, however, treatment groups met only twice weekly for a total of 13 meetings.

Control subjects were 35 women enrolled in certain exercise classes at the West Side Y.M.C.A. or at the Central Y.M.C.A., also in Knoxville, Tennessee, as follows: (1) Musical Aerobics (West Side Y.M.C.A., 6:30 to 7:45 p.m., Tuesday and Thursday, N = 21); (2) Fitness I (Central Y.M.C.A., either 4:45 to 5:30 p.m. or 5:30 to 6:15 p.m., Monday, Wednesday and Friday, N = 9); and (3) General Fitness I (West Side Y.M.C.A., 5:45 to 6:30 p.m., Monday, Wednesday and Friday, N = 5).

Data (Appendices A and E) were also collected on 18 women who did not participate in either treatment. They fell into one of the following categories: (1) women enrolled in exercise classes assigned to a treatment but who did not attend any program meetings; and (2) women enrolled in several Central Y.M.C.A. beginning exercise classes, specifically, Fitness I (11:30 a.m. to 12:10 p.m., Monday, Wednesday and Friday), Aerobic Exercise (5:15 to 6:00 p.m., Tuesday and Thursday), or Slimnastics (12:10 to 12:40 p.m., Monday, Wednesday and Friday).

General Procedures

Experimental groups. At the initial meeting between the researcher and the classes assigned to either treatment, the researcher introduced herself and explained the program being offered. Questions were answered. Those women who agreed to participate were given: (1) a questionnaire (Appendix A) which asked for demographic information, physician diagnosed chronic medical problems and medications being taken, previous leisure time physical activity behavior and reasons for joining the exercise class; and (2) a consent form (Appendix B or C) to complete. They were told that they could be contacted in the

future to update the information they were presently providing. The researcher was available to clarify the type of information requested.

For the Instructional group, the mini-lectures began following the second exercise meeting. The group met each Monday and Wednesday for a total of 13 meetings. Lecture material was presented in approximately 10 minutes with questions and discussion sometimes extending the meeting time. The curriculum for the mini-lectures can be found in Appendix C.

The Counseling groups also met immediately following their exercise classes for a total of 13 meetings. The groups met for at least 10 minutes initially, although later sessions, which were mainly composed of individuals reporting their progress, varied in length.

At the last meeting of the sessions, the researcher thanked group members for their participation and asked for recent changes in addresses and phone numbers.

Control groups. At the first meeting of the classes designated controls, the researcher introduced herself and explained the purpose of their involvement. They were asked to complete a questionnaire (the same one used for the experimental groups) and a consent form (Appendix D). They were told that the researcher needed the information in order to compare it with other exercise groups. They were also told that they could be contacted in the future, thus a consent form was used. The researcher was present to clarify the type of information which was being asked.

Other exercise classes. Questionnaires were also obtained from some women in the classes designated experimental who chose not to participate in the treatment programs. Furthermore, women in several classes at the Central Y.M.C.A. which could not be used for experimental groups completed a questionnaire. This additional information provided the opportunity to compile a profile on women who enrolled in organized group exercise classes such as are offered at a Y.M.C.A.

Follow-up. During the sixth and tenth month post-treatment, the researcher attempted to contact by telephone every subject who had completed a questionnaire. The researcher identified herself and reminded them of their contact with her through the Y.M.C.A. classes. Personal data were updated and questions regarding the subject's leisure time physical activity since completing the class were posed and recorded on a follow-up data sheet (Appendix E).

Verification of some of the information supplied by a sample of the subjects regarding their reported physical activity was made. Checks were made on those individuals who reported continuing with exercise classes at a Y.M.C.A., utilizing the Y.M.C.A. registration records.

Program Development

Instructional program. A series of mini-lectures were presented following the exercise class. As much information as possible was disseminated in a 10 minute presentation. Questions and discussion often lengthened the session, however, the women who could not stay

longer were excused. Only basic material on each topic was covered. Some of the topics were covered over several meetings, depending on the group's interest and participation. An outline of the subjects which were considered for presentation is found in Appendix C. Lessons I through VII were covered with both instructional groups. Additional lessons varied depending on the choice of the group members. The topics were selected to fulfill the following purposes: (1) to promote a better understanding of basic physiology involved in exercise; (2) to discuss beneficial effects of regular activity; (3) to offer advice on practical aspects of exercising; and (4) to address related health issues. It was hoped that covering a wide variety of topics would appeal to all subjects taking the class. Furthermore, it was hoped that by gaining knowledge about a behavior presently engaged in, adherence might be encouraged.

Counseling program. Counseling treatment was utilized in this study as an attempt to influence adherence to an exercise program through a commitment to a long term program. The commitment was made at the end of the treatment sessions through a written contract. The purpose of the treatment sessions was to familiarize subjects with select behavior change techniques in order that they might acquire certain skills which would facilitate adhering to their final commitment.

The behavior change program, as outlined in Appendix F, is based on Reality Therapy as developed by William Glasser. At the first meeting subjects chose a behavior that they wished to change, called

a target behavior. Subsequent meetings were used to consider all possible steps in working toward changing the target behavior. The idea, then, was to work toward the final change slowly, that is, making small changes which ultimately would lead to the final goal. Subjects developed weekly plans and a written contract was made for each plan. A sample contract is shown in Appendix G. These plans were reviewed at the end of a week to be altered as necessary in order that the individual continue making progress. If for any reason a plan was not effective, the subject changed her approach for the following week. At the group meetings individuals could report their progress, seek ideas for weekly plans, discuss problems which arose in keeping their commitments and generally receive peer support for the task of changing their behavior. Toward the end of the sessions, a few minutes was taken for discussion of other behavior modification techniques as listed in Appendix F (V). Finally, the final commitment to a continued exercise program was made. An explanatory note was distributed to the group members, they were given 5 days to develop the plan, and a contract was then signed by the individual and by the researcher (Appendices H and I).

Instrumentation

The data for this study were collected in two ways: (1) questionnaire which each subject completed on her own; and (2) information obtained through phone conversations between the subject and the researcher, using a questionnaire to guide questioning and record responses. The first data collection included demographic data

(name, address, phone number, marital status, level of education completed, race, work status, work schedule), medical information, smoking habits, leisure time physical activity, and reasons for participating in the exercise class. The follow-up data included an update of the original information, number and ages of children, and an account of activity since the conclusion of the Y.M.C.A. class (both at 6 and 10 months), and reasons for either adherence or non-adherence to an exercise program. Data on leisure time physical activity were quantified by estimating caloric expenditure for reported activities. Caloric expenditure by physical activity was calculated as follows: days per week (frequency) x number of minutes per day (duration) x number of weeks (engaged in the activity) x estimated caloric expenditure by body weight for that activity (Katch and McArdle, 1977, Appendix B; Kuntzleman, 1975; Adamson, 1978; Noble and Howley, 1979).

Statistical Treatment

In an attempt to present a profile of the type of women who engaged in a leisure time exercise program, information from 86 women, including all experimental subjects, control subjects and the information group, was compiled and compared over the three data collection points. It was determined that the larger the number of women used, the more complete the profile would be. Percentages were used for most of the description. However, leisure time physical activity data were presented by range, standard deviation and mean at the three collection points.

For analysis of the effects of the treatment programs on adherence to a regular exercise program, data from experimental and control subjects only were used. In order to determine whether the experimental groups were different before treatment from either the control groups or each other, comparisons were made based on the data from the pre-treatment questionnaire (Appendix A). One-way Analysis of Variance was used to determine significant differences between groups on the following variables: (1) age; (2) education level completed; (3) height; (4) weight; (5) number and ages of children; (6) caloric expenditure from leisure physical activity; (8) frequency and duration of exercise sessions, intensity of activity and number of activities participated in during 6 months prior to treatment. Chi-square test for independent samples was used to test for significant differences between groups on the following variables: (1) marital status; (2) race; (3) work status; (4) chronic medical problems; (5) medications used; and (6) smoking habits. If the groups were found to be homogeneous, that is, there were no differences at $p < .20$ level of significance between groups for each variable, then the post-treatment data was analyzed by using one-way Analysis of Variance for parametric data, and Chi-square test for independent samples for non-parametric data. Where significant differences were found, the Scheffé post hoc test was applied to determine which groups differed. When the groups were different prior to treatment at $p < .20$ level of significance, the Analysis of Covariance was used on parametric data, using the pre-score as the covariate, and Chi-square test using change scores was used for non-parametric data.

In order to address questions relating to the effect of treatments on adherence to regular physical activity, the amount of physical activity the subjects engaged in was assessed. Comparisons were then made between amount of exercise engaged in before treatment and the amount at 6 and 10 months post-treatment. Quantification of subjects' activity levels was made by estimating caloric expenditure from reported activities. Caloric expenditure from leisure time physical activity was determined based on reported frequency, duration and type of activity. The formula used was: day(s) per week x duration per session x caloric expenditure of activity by person's weight = caloric expenditure per week for activity then, caloric expenditure per week x number of weeks over 6 months (or 4 months) = caloric expenditure for activity over 6 months (or 4 months). Estimates of caloric expenditure by activity were taken from Katch and McArdle (1977, Appendix B) and Kuntzleman (1975), and for several unique activities from Adamson (1978) and Noble and Howley (1979). Total caloric expenditure from all reported physical activities for the 6 months preceding the treatments and at 6 to 10 months after the conclusion of the exercise class were computed for each subject.

Additional data was collected as follows: (1) reasons for enrolling in a Y.M.C.A. exercise class; (2) reasons given by adherers for their continued participation in regular activity; (3) reasons given by non-adherers for their inability to maintain a regular exercise regimen; and (4) results of the attempt to verify additional Y.M.C.A. classes reported as having been taken.

CHAPTER IV

ANALYSIS OF DATA

Introduction

Discussion of the results of this study will be presented in sections as follows: (1) demographic information on subjects at pre-treatment; (2) post-treatment comparisons on demographic information; (3) analysis of physical activity levels at pre-treatment and follow-up contacts; (4) group differences on other variables; (5) description of subjects' motivation for participation in Y.M.C.A. classes and in leisure time exercise programs; and (6) description of self-reported reasons for non-adherence to an exercise program.

Variables considered to have any possible influence on one's ability to adhere to a regular exercise program were measured. They were: (1) marital status; (2) educational level; (3) age; (4) height; (5) weight; (6) race; (7) occupational status; (8) current medical problems; (9) prescribed medications used; (10) number and ages of children; and (11) number of previously attended Y.M.C.A. classes. Since the primary question of this study was what effect two treatments, that is, instruction and counseling, have on long term adherence to exercise programs, the main focus in discussing the results will be on group differences in levels of activity at the follow-up contacts, as well as the frequency, duration, intensity, and number of the different activities participated in on a regular basis.

Description of Subjects

From an initial group of 92, follow-up data were collected on 86 subjects at 6 months and 85 subjects at 10 months. Eighteen of these subjects were classified as an information group, adding to an overall profile of the type of women participating in exercise classes, but not serving as either experimental or control subjects. Table 4.1 shows the frequency distribution of subjects by groups. There were different numbers of subjects for each group, the smallest being the counseling fitness group ($N = 2$) and the largest being control dance ($N = 21$). In order to be used as experimental subjects, the women had to have attended 70% of the counseling or education sessions and be available for follow-up at 6 months. Follow-up data for one subject in the dance control group was not available at 10 months. Eighty-four percent of the subjects participated in classes at the West Side Y.M.C.A. while the fitness control group (16%) participated at the Central Y.M.C.A.

As show in Tables 4.2 and 4.3, most of the subjects were married (86%), were 40 years of age or younger (85%), attended some college (86%), were Caucasian (92%), had two or fewer children (95%), had no chronic medical problems (87%), took no prescribed medications (85%), and were non-smokers (83%). Slightly more subjects worked outside the home than were homemakers (46.5% and 31%, respectively). The mean height of the subjects was 64.8 inches and weight was 132.9 pounds.

TABLE 4.1

PERCENTAGES OF SUBJECTS BY TREATMENT
GROUP AND EXERCISE CLASS

Treatment Groups	Exercise Class					
	<u>Dance</u>		<u>Fitness</u>		<u>Totals</u>	
	N	%	N	%	N	%
Instructional	7	10	8	12	15	22.0
Counseling	16	24	2	3	18	26.5
Control	<u>21</u>	<u>31</u>	<u>14</u>	<u>21</u>	<u>35</u>	<u>51.5</u>
Totals	44	65	24	36	68	100
Information	--	--	--	--	<u>18</u>	--
Grand Total					86	

TABLE 4.2

PERCENTAGE OF SUBJECTS BY VARIABLE

Variables	Description	Number	Percent
Session	West Side Y.M.C.A.	72	83.7%
	Central Y.M.C.A.	14	16.2%
Marital Status	Married	74	86.0%
	Single	9	10.0%
	Other	3	4.0%
Race	Caucasian	79	91.8%
	Afro-American	1	1.1%
	Puerto Rican	2	2.3%
	Chinese American	4	4.6%
Working Status	Homemaker	31	36.0%
	Working outside home full-time	40	46.5%
	Working outside home part-time	15	17.4%
Medical History	Hypertension	3	3.5%
	Asthma	2	2.3%
	Other	6	6.9%
	None	75	87.2%
Prescribed Medications Used	Take regularly	13	15.1%
	None	73	84.8%
Smoking Habits	Up to 20 per day	10	11.6%
	21-30	4	4.6%
	31-40	1	1.2%
	None	71	82.5%

TABLE 4.3

RANGE, MEAN AND STANDARD DEVIATION
FOR PARAMETRIC VARIABLES

Variable	Range	Mean	S.D.
Education (years completed)	12-18	15.37	1.98
Age (in years)	21-60	33.8	8.06
Height (inches)	60-73	64.8	2.5
Weight (pounds)	97-206	132.9	22.9
Number of Children	0-4	1.01	1.01

Follow-up data were obtained on certain variables which seemed more likely to change in the 10 months following the treatment sessions and more likely to influence adherence to an exercise program. Table 4.4 shows the changes at 6 months and 10 months in working status, chronic medical problems, prescribed medications used, smoking habits, and weight. Of importance is the increase in non-smokers, the increase in chronic medical problems and use of medications, and the slight change in working status. Statistical analysis to compare treatment groups with control subjects will be presented in another section of this chapter.

Statistical Analysis of Physical Activity Levels

All subjects. The discussion of results in this section involves all 86 subjects at pre-treatment and 6 months post-treatment and 85 subjects at 10 months post-treatment, including 18 subjects classified as the information group. On the questionnaires, the amount of physical activity each subject had engaged in during leisure time for 6 months prior to intervention and at follow-up contacts at 6 and 10 months post-treatment were recorded. Beginners have been defined as those subjects expending less than 300 calories per week.

As Table 4.5 indicates, the number of subjects who engaged in no leisure time physical activity decreased 6 months post-treatment from 13 (.2%) to 6 (.07%), only to increase at 10 months post-treatment to 14 subjects or .2%. The number of subjects expending less than 300 calories per week dropped from 38% pre-treatment to

TABLE 4.4

COMPARISON BY PERCENTAGES OF CERTAIN VARIABLES AT
THREE DATA COLLECTION POINTS

Variable	Description	<u>Pretreatment</u>		<u>6 months</u>		<u>10 months</u>	
		No.	%	No.	%	No.	%
Working Status	Homemaker	31	36.0	30	34.8	33	38.8
	Working full-time	40	46.5	39	45.3	36	42.4
	Working part-time	15	17.4	17	19.7	16	18.8
Medical History	Hypertension	3	3.5	3	3.5	4	4.7
	Asthma	2	2.3	2	2.3	2	2.4
	Other	6	6.9	12	13.9	13	15.3
	None	75	87.2	69	80.2	66	77.6
Prescribed Medications Used	Taking regularly	13	15.1	15	17.4	16	18.8
	None	73	84.8	71	82.5	68	80.0
Smoking	Up to 20 per day	10	11.6	10	11.6	10	11.8
	21-30	4	4.6	1	1.2	1	1.2
	31-40	1	1.2	0	0	0	0
	None	71	82.5	75	87.2	74	87.1
Weight (pounds)		<u>Range</u>	<u>Mean</u>	<u>S.D.</u>	<u>Range</u>	<u>Mean</u>	<u>S.D.</u>
		97-206	132.9	22.9	100-196	132.5	21.1
					101-200	132.5	20.9

TABLE 4.5

CALORIC EXPENDITURES FOR ALL GROUPS OVER
ALL COLLECTION POINTS

Caloric Expenditure	6 months Pre- Treatment	6 months Post- Treatment	10 months Post- Treatment
Zero	13 .2%	6 .07%	14 .2%
<300 per week (Beginner)	33 38%	15 17%	29 34%
>300 per week	53 62%	71 83%	56 66%
Highest	129,428 5,393/wk.	139,995 5,833/wk.	67,376 4,211/wk.
Second highest	64,628 2,693/wk.	92,308 3,846/wk.	65,393 4,087/wk.
Mean	14,752 615/wk.	25,509 1,063/wk.	12,389 774/wk.
Lowest	0	0	0
Second Lowest	945 39/wk.	651 27/wk.	1,620 101/wk.

17% at 6 months follow-up, but rose again to 34% at 10 months post-treatment. Mean caloric expenditure increased at 6 months post-treatment and decreased again at 10 months post-treatment. Also of interest is that the gap between the highest number of calories expended (129,428; 139,995; 67,376 for the three data collections, respectively) and the next highest (64,628; 92,308; 65,393) closes at each data collection.

The range of caloric expenditure for leisure time physical activity at all three data collections is very large (Table 4.6). Thus the standard deviations are very high. To illustrate the magnitude, the subject whose caloric expenditure was the highest at pre-treatment and 6 months post-treatment was enrolled in 32 classes at the Y.M.C.A. within 6 months. And the difference between her caloric expenditure and the next closest subject is 64,800 calories (this is approximately one-half the amount of the highest subject). The range from the lowest caloric expenditure (0) to the second lowest (945, 651 and 1,620, respectively) is also dramatic.

Along with the range, mean, and standard deviation of caloric expenditure, Table 4.6 shows statistics for the frequency, intensity and duration of physical activity, and the total number of activities of participation at each follow-up contact. At all three points in data collection, the majority of the subjects exercised between 2 and 3 days per week (60.4%, 65%, and 58.8%). There appears to be small differences on the average duration of activity sessions (37 to 43 minutes), number of activities of participation ($M = 1.24$, 1.87, and 1.34), and intensity of reported activity ($M = 5.86$, 6.47,

TABLE 4.6

COMPARISON OF CALORIC EXPENDITURE, FREQUENCY, DURATION AND NUMBER OF LEISURE TIME
PHYSICAL ACTIVITIES BY RANGE, MEAN AND STANDARD DEVIATION AT THREE DATA COLLECTION POINTS

	Pre-treatment			6 Months			10 Months		
	Range	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.
Activity	0-129,428	14,752	17,802	0-139,995	25,509	24,476	0-67,376	12,389.5	13,524
Caloric	cal. for			cal. for			cal. for		
Expenditure	6 months			6 months			4 months		
Frequency	0-7	2.36	1.52	0-6	2.79	1.28	0-7	2.54	1.75
No. days	days								
Intensity	0-14	5.89	2.94	0-15	6.47	2.46	0-10	5.4	2.75
Cal/min for	cal./			cal./					
each activity	minute			minute					
Duration	0-270	40.2	35.01	0-155	43.39	24.5	0-128	36.78	23.74
Minutes	minutes			minute					
Number	0-4	1.24	.825	0-4	1.87	.943	0-3	1.34	.88
Different	# diff.								
Activities	activit.								

and 5.4). A few subjects reported engaging in activities for long periods at one time, such as snow skiing and gardening, thus explaining the range of duration values. This situation occurred at all three data collection points (although snow skiing was only reported at pre-treatment and 10 months post-treatment).

Experimental Groups

In order to determine the effects of counseling and educational programs on adherence to exercise programs, comparisons were made on caloric expenditure at all three data collection points for subjects in the experimental and control groups only (N = 68 at 6 months pre-treatment and 6 months post-treatment; N = 67 at 10 months post-treatment). Differences between groups prior to treatment were computed using Analysis of Variance (Table 4.7). There were no differences between groups in caloric expenditure for leisure time physical activity for the 6 months prior to interventions ($p = .35$). At the 6 month follow-up, two groups were found to be significantly different in caloric expenditure. Using the Scheffé post-hoc test, the dance counseling group expended significantly more calories in exercise programs than the fitness control group ($p = .007$). Again at 10 months follow up contact, differences between groups were found. The dance counseling group had greater caloric expenditure for 4 months (between the first follow-up at 6 months post-treatment and the follow-up at 10 months post-treatment) than the dance control and fitness control groups. A third group, fitness counseling, had a smaller mean ($M = 4647.5$) than either of the two

TABLE 4.7

STATISTICAL ANALYSIS OF EXPERIMENTAL AND
CONTROL GROUPS FOR FIVE VARIABLES

Variable	6 Months Pre-treatment	6 Months Post-treatment	10 Months Post-treatment
Total Caloric Expenditure (by M)	No significant differences $p = .35$	FCT ¹ 13784.8* FCS 16060.0 FI 16823.8 DCT 22367.2 DI 35250.7 DCS 4587 4* $p = .007^*$	FCS 4647.5 DCT 6939.6* FCT 7083.1* FI 8853.1 DI 20346.4 DCS 25407.4* $p = .0003^*$
Frequency	FCS 1.5 DCT 1.9* DI 2.0 FI 2.1 FCT 2.6 DCS 3.4* $p = .06^*$	No significant difference ² $p = .67$	No significant difference ² $p = .15$
Duration	No significant differences $p = .44$	No significant differences $p = .69$	No significant differences $p = .44$
Intensity	No significant differences $p = .20$	DCT 5.2* FCS 6.0 FCT 6.3 FI 6.5 DI 7.4 DCS 8.3* $p = .01^*$	FCS 3.0 FCT 4.2* DCT 4.5* FI 5.9 DI 6.1 DCS 7.5* $p = .003^*$
Number of Activities	No significant differences $p = .15$	No significant differences $p = .88$	No significant differences $p = .07$

¹FCT--Fitness Control
DCT--Dance Control
DI --Dance Instruction

FI --Fitness Instruction
FCS--Fitness Counseling
DCS--Dance Counseling

²Frequency scores at 6 months post-treatment were used as the covariate for post-treatment analysis.

*Significant difference with p value listed at bottom of column.

groups (fitness control $M = 7083.14$ and dance control $M = 6939.6$) with which significant differences were found, yet no significant differences were found between fitness counseling group and dance counseling group ($M = 25,407.4$). The fitness counseling group was composed of only two subjects.

Other variables which relate to the quality of exercise programs and were measured were frequency of exercise, duration of each session, intensity of the particular activity and number of activities of participation. Two group differences were found in frequency of exercise prior to treatment. Dance counseling group ($M = 3.38$ days per week) exercised significantly more often ($p = .06$) than the dance control group ($M = 1.9$ days per week). Since there was an initial difference on the variable, for further comparisons of frequency at 6 months post-treatment and 10 months post-treatment, the first frequency score was used as the covariate for data analysis at 6 months and 10 months post-treatment. There appears to be no group differences at either follow-up.

No groups were found to be significantly different in the duration of each exercise session. In comparing intensity levels for each group, there was no difference found between groups the 6 months before intervention. At 6 months post-treatment, significant differences were found ($p = .01$) between the dance counseling group ($M = 8.3$ calories per minute) and dance control group ($M = 5.2$ calories per minute). Again at 10 months follow-up the dance counseling group's mean caloric expenditure per minute (7.5) for activities reported was significantly higher than for dance control

group (4.45) and fitness control (4.2). A similar phenomenon occurred with intensity at 10 months follow-up as occurred with mean total caloric expenditure at 10 months. The fitness counseling group had a lower mean (3.0) than the fitness control and dance control, yet no significant difference was computed. There was no difference in the number of activities that the groups engaged in at any of the three data collection points.

Statistical Analysis of Other Variables

Additional comparisons were made between experimental and control groups on the following variables: marital status, education level completed, age, height, weight, race, working status, medical history, prescribed medications used, smoking habits, number of children, age of children, and number of Y.M.C.A. classes taken. Those of the above listed variables which would change by follow-up contacts and might affect adherence to exercise programs were measured at 6 months and 10 months post-treatment.

Variables of non-parametric nature were analyzed by using Chi-square test for independent samples. Because of the low number of subjects in groups by treatment, cells had to be collapsed in five of six cases (marital status, race, medical history, prescribed medications used, and smoking habits) into experimental versus control groups in order to do the analysis. No significant differences were found ($p > .05$) 6 months prior to treatment for the following variables: marital status, race, medical problems, prescribed medications used, and smoking habits. At $p < .10$, differences were found for marital status (more married women in the experimental groups than in control

groups) and race (more "other" races in experimental groups than in control groups).

Variables classified as parametric by nature were analyzed by using Analysis of Variance. No significant differences were found 6 months prior to treatment on education level completed, height, weight, number of previous Y.M.C.A. classes taken and mean age of children. Significant differences were found ($p < .05$) as follows: (1) age, between fitness instruction ($M = 43.5$ years) and dance control group ($M = 28.6$ years) and between fitness counseling group ($M = 47$ years) and dance control group ($M = 28.6$ years); and (2) number of children, as fitness control group ($M = .07$ children) had significantly fewer children than dance counseling ($M = 1.37$), dance instruction ($M = 1.57$) and fitness instruction ($M = 2.0$) groups. Data gathered at 6 months and 10 months post-treatment on certain variables revealed no significant differences between groups for: (1) weight, (2) chronic medical problems, and (3) prescribed medications taken.

Although cells had to be collapsed for working status, four groups could be compared: dance control, fitness control, instruction group, and counseling group. There was a significant difference between them ($\chi^2 = 31.99$, $p < .05$). More women worked either part- or full-time outside the home than were full-time homemakers. It also appeared that more control subjects work outside the home than experimental subjects.

Self-reported Reasons for Participation and Perceived Benefits of Exercise

To get some idea on the subjects' perceived ideas on the benefits of regular activity, and their motivations for engaging in regular physical activity, they were asked to indicate on the questionnaire three reasons for their participation in the Y.M.C.A. class enrolled in at the time this study began (Appendix A). There were six possible responses provided and the category "Other" for additional reasons or reasons not provided. Table 4.8 indicates the responses.

As part of the data collected at the 10 months post-treatment contact, questions were asked to subjects either as adherers or non-adherers which concerned perceived benefits derived by physical activity, problems with adhering to a regular exercise program and attitude toward physical exertion (Appendix E). Further, the dance and fitness counseling groups were asked about their use of the exercise contract, completed as part of the counseling treatment. As one might expect from open-ended questions, the responses given were numerous and varied. The responses were grouped into categories. Summary sheets can be found in Appendix J for each question. The majority of subjects made more than one comment for each question and all responses were recorded.

Verification by Use of Y.M.C.A. Records

Fifty-one subjects reported that as part or all of their leisure time physical activity they attended a Y.M.C.A. exercise class at the West Side Y.M.C.A. Y.M.C.A. registration books indicated that

TABLE 4.8

REASONS FOR ENROLLING IN Y.M.C.A. EXERCISE
CLASS BY PERCENTAGE

	Choice #1	Choice #2	Choice #3
Improved Physical Fitness	73.2	15.8	8.2
Improved Appearance	8.1	40.0	27.3
Lose Weight	13.9	31.7	26.0
Meet Others	--	2.4	12.3
Influenced by Friend or Relative	--	6.0	10.9
Take Advantage of Y.M.C.A.	--	1.2	12.3
Other	4.7	2.4	2.7
No Response	--	.04	.2

37 subjects (73%) had formally registered for all classes they reported. Of the 13 subjects (26%) in question, six had registered for some classes, but could not be found on every class roll for which they reported attending. In discussion with Y.M.C.A. personnel (office clerk and aerobic dance instructor), it was revealed that women could have attended without having registered at the office.

Summary

The purpose of this chapter was to present the analyses of the data. In order to answer the research questions, caloric expenditure for leisure time physical activity was compared for all groups for the 6 months prior to treatment program, 6 months post-treatment and 10 months post-treatment. Analysis of Variance was used as the statistical test to determine any significant differences between groups.

Personal information was also gathered on each subject that was thought to have possible influence on the ability to continue a regular exercise program. The subjects had to be grouped as experimental or control only, not in the six categories by exercise class and treatment group, for comparisons on the following variables: marital status, working status, race, medical problems, prescribed medications used, and smoking habits. Chi-square test for independent samples was used for the statistical analysis. Subjects remained in six separate groups for comparisons of educational level completed, height, weight, age, previous number of Y.M.C.A. classes attended, number of children, and mean age of children and Analysis

of Variance was used as statistical test to detect differences. Comparisons were made for 6 months prior to study, 6 months post-treatment, and 10 months post-treatment.

Data were presented on the subjects' perceived benefits of regular physical activity and reasons for participating in Y.M.C.A. exercise classes prior to this study. Data indicating the subjects' reasons for continuing an exercise program (at 10 months follow-up contact), their attitude toward physical exertion, and problems with maintaining a regular exercise program, were also presented. The method used to assess the accuracy of the subjects' reports of Y.M.C.A. classes taken was discussed.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the effect of two interventions, that is, health instruction and a counseling program, on adherence of women to a regular exercise program. Adherence was defined as expending 300 or more calories per week through leisure time physical activity. Health instruction and the counseling program were conducted immediately following the conclusion of two different exercise classes in which the subjects had previously registered. The control subjects also attended similar exercise classes. Groups were determined by the specific exercise class of participation, the treatment program they elected to join or, for the controls, the lack of participation in a treatment program.

Data on physical activity patterns, as well as personal characteristics and demographic information, were collected at the beginning of the research project (information on physical activity for the previous 6 months was ascertained) and at 6 and 10 months following the completion of the classes. A questionnaire was used to collect data, filled out by each subject at the first collection point, and by the researcher at follow-up contacts based on telephone conversations.

Comparisons were made between experimental and control groups of caloric expenditure through leisure time physical activity.

Differences on personal characteristics and demographic data were described to ascertain if influencing factors were significantly different between groups.

Data were also collected on an additional 18 women which were added to a description of women who participated in a regular exercise program. This was done in an attempt to understand some factors which influence continued participation in regular exercise.

Findings

Based on a significant level of $p < .05$, the findings of this study are as follows:

1. Subjects were predominantly married, Caucasian, healthy, non-smokers, and at least high school graduates.
2. The majority of subjects worked either full- or part-time outside the home.
3. At pre-treatment data collection, 38% of the women expended less than 300 calories per week through leisure time physical activity.
4. At the 6 month post-treatment contact, 17% reported expending fewer than 300 calories per week through leisure time physical activity.
5. At the 10 month post-treatment contact, 34% reported expending fewer than 300 calories per week through leisure time physical activity.
6. No significant differences were found among groups for caloric expenditure for leisure time physical activity during 6 months pre-treatment.

7. At 6 months post-treatment, the dance counseling group expended significantly more calories for leisure time physical activity than the fitness control group.

8. At 10 months post-treatment, the dance counseling group expended significantly more calories for leisure time physical activity than both fitness control and dance control groups.

9. The dance counseling group tended to exercise more frequently than the dance control group during the 6 months prior to intervention ($p < .06$).

10. No significant differences were found between any groups for frequency of regular physical activity at 6 months or 10 months following intervention.

11. No significant differences in duration of activity sessions were found between any groups at any of the data collection points.

12. No significant differences were found between any group on intensity of physical activity for the 6 months prior to intervention.

13. The dance counseling group exercised with significantly greater intensity than the dance control group at 6 months post-treatment.

14. The dance counseling group exercised with greater intensity than the fitness control and dance control groups at the 10 months post-treatment.

15. The groups did not differ in number of activities engaged in at any of the data collection points.

16. No significant differences were found at pre-treatment between any of the groups on marital status, race, chronic illnesses, prescription medicines used and smoking habits.

17. No significant differences were found between any of the groups at pre-treatment for the following: education level completed, height, weight, number of previous Y.M.C.A. classes taken and mean ages of children.

18. The dance control group was significantly younger in age than the fitness counseling and fitness instruction groups.

19. The fitness control group had significantly fewer children than dance counseling, dance instruction and fitness instruction groups.

20. At the 6 and 10 month follow-up contacts, no significant differences were found between any groups on weight, chronic illnesses and prescribed medications used.

21. More women worked either full-time or part-time outside the home than were full-time homemakers. There was also a trend toward more control subjects working outside the home than experimental subjects.

22. The majority (73%) of subjects reported their desire to improve physical fitness as the primary reason for taking the Y.M.C.A. exercise class.

Conclusions

Based on the findings of this study, considering only the subjects who agreed to participate in this study and in answer to the research questions proposed, the following conclusions were drawn:

1. A counseling component in a dance class improves adherence of women to a regular exercise program.
2. Health instruction as utilized in this study is ineffective in improving adherence of women to a regular exercise program.

Recommendations

The following recommendations for future consideration regarding research on adherence to regular exercise programs were made:

1. Similar studies should utilize one researcher to conduct both the exercise class and motivational programs.
2. The motivational program should be incorporated as an integral part of the exercise class, not a separate part of it.
3. The time allotted to conduct a motivational program should be adequate to cover the material thoroughly or conduct the program completely.
4. Similar future studies should:
 - a. increase number of subjects,
 - b. utilize a variety of motivational techniques, and
 - c. make follow-up contacts with subjects over longer periods of time.
5. More accurate ways of ascertaining days and time spent in leisure time physical activity should be devised, for example, subjects use of record books or calendars to record activity as they actually complete sessions.

6. Verification techniques need to be used in future studies which better determine the accuracy of the information given by the subjects.

7. The subjects need to be better informed and encouraged in the use of alternative exercise programs in adverse weather conditions so that they can maintain previous activity levels.

8. Additional research needs to be done on women's exercise patterns, motivations, influencing factors so that motivational techniques that are appropriate to women can be incorporated into exercise classes, programs and health and fitness information.

CHAPTER VI

FURTHER DISCUSSION

The purpose of this chapter is to offer some insight into why the data produced the results they did, and discuss observations made by the researcher that are not necessarily reflected in the results.

Because of some research techniques used in this study, the results must be viewed cautiously. Using self-reported data can cause difficulties in gathering accurate data. I do not believe many, if any, of the subjects in this study intentionally exaggerated their involvement in a regular exercise program. However, it is possible to forget a day or two taken off for illness, or a week skipped for vacation, etc. when reporting 6 months or 4 months of activities at one time, even though the subjects were asked to report the number of weeks that were skipped at each follow-up contact. The use of logs, records or some other means of accurately verifying the information given is necessary in order to avoid doubts about self-reported data. The results of this study cannot be dismissed because of this means of data gathering, as any exaggeration of physical activity can be assumed to have taken place across all groups.

Secondly, interpretation of the results is difficult when using groups with low numbers. The problems with interpretation due to the dance fitness group's low number ($N = 2$) will be discussed later. In essence, this group had to be discounted in determining whether differences in caloric expenditure for leisure time physical activity

were caused by the treatment, exercise class or a combination of the two. Also, the low number in several groups meant that in using the Chi-square test to determine significant differences for several variables, cells had to be collapsed. Consequently, comparisons among the six groups used for parametric variables could not be made for the nonparametric variables. It was not possible to determine if any of these variables had particular influence in continuing regular exercise programs for a particular group.

The trend for adherence rates to decrease over time, as reported in the literature, occurred in the present study as well. A contributing factor found in this study was that the data from the final follow-up covered 4 months involving late fall and early winter seasons, and three holidays: Thanksgiving, Christmas, and New Year's. In pursuing the reasons given by the subjects for non-adherence to exercise programs and the reported difficult aspects of maintaining a regular schedule for exercise (Appendix J), I found that adverse weather conditions and holiday interruptions were mentioned often. Data collection over a different period of time, or over a longer period of time, could have influenced the results. Health and physical educators need to recognize these times as particularly difficult in adhering to exercise, and to indicate that they must address this problem to the groups they work with and in the information about exercise that they distribute.

The dance counseling group reported the greatest caloric expenditure through leisure time physical activity. The atmosphere in the dance class from which these subjects came (Aerobic Dance)

needs to be explained. Most of the group seemed to know a number of the other members of the class. There was a comraderie that appeared to exist among them. The teacher was very dynamic and the routines were dance-like, done to popular, upbeat music. The routines appeared complicated, unique and very challenging to learn. This seemed to be a plus, for most of the class appeared to enjoy this activity immensely. Another experimental group, dance instruction, was made up of members of an Aerobic Dance class that met at a different time but with the same teacher. Their mean caloric expenditure for leisure time physical activity was second highest of all groups, although not significantly different from the lowest group. The third dance class used in the study, as a control group, were members of a Musical Aerobics class, which involved regular exercises performed to music. Although they did well at the 6 months post-treatment contact (third highest mean caloric expenditure), they dropped to second lowest at 10 months. Involvement in the Musical Aerobics class seemed to be less effective than the Aerobic Dance class in long term adherence to an exercise program. It was obvious to me that the dynamics of the West Side Y.M.C.A.'s Aerobic Dance class greatly influenced continued participation in a regular exercise program.

To dispell the notion that the women taking Aerobic Dance were more athletically gifted, and for that reason more inclined to adhere to exercise, the data showed no difference between groups for the 6 months prior to this study for physical activity levels, number of previous activities of participation or number of previous Y.M.C.A.

classes taken. Also, although many of the group did a good job in doing the routines, many were far from expert dancers.

The influence of the counseling treatment alone was not verified by subsequent comparisons. The other group involved in the counseling treatment was the counseling fitness group. If the counseling treatment was the key, this group would have done equally as well in continuing physical activity. However, the two subjects who completed the treatment had extremely low levels of physical activity. I observed that the counseling treatment influenced some members of both treatment groups to deal with related health issues, such as smoking, excessive eating and poor eating habits (as was a desired outcome of the treatment). But whether a carry-over effect to maintaining regular exercise occurred by using the same behavioral change technique is not perfectly clear.

Another aspect of the counseling treatment which was used to influence continuing exercise was the exercise contract (Appendices H and I) made by the subjects with the researcher at the end of the program. However, when asked whether the subjects had used the contract through 10 months following the sessions, only one subject had posted it, and then reported that she had not fulfilled it. Two subjects reported that they had kept it in mind. Most did not know what they had done with it and had not used it as a motivator to continue exercising.

The key to adherence to a regular exercise program may well lie in the choosing by an individual of exercise programs of particular

interest to her. This challenges a community to offer a variety of programs of differing styles, and for instructors to encourage class members to try different ones if not completely satisfied with one she is engaged in. Each individual involved in an exercise program has unique purposes and goals (Appendix J). In a good program, progress towards goals should be monitored. The closer an individual comes to achieving her objectives, the greater the chance she will adhere to an exercise program as a life-long necessity.

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APPENDICES

APPENDIX A

PRE-PROGRAM QUESTIONNAIRE

Name: _____ Session: _____

Address: _____ Class: _____

_____ Time: _____

Phone: home _____ Marital status: check one

business _____ ☐ married

Education: circle last grade or level completed ☐ single

1 2 3 4 5 6 7 8 9 10 11 12 _____ other, please specify _____

college: 13 14 15 16 _____

post graduate studies: Master's 17 18 Age: _____ years _____ months

Doctorate 19 20 21 Height: _____

Race: check one Weight: _____

☐ Caucasian ☐ Afro-American ☐ Native American ☐ Mexican American

☐ Puerto Rican ☐ Other, please specify _____

Occupation: _____

your title: _____

do you work: check one ☐ full time ☐ part time

How many hours per week do you work: _____

Medical History: please check any of the following chronic illnesses you have been

doctor diagnosed as having and presently suffer from:

Heart problems ☐

angina pectoris ☐ other: specify, _____

Hypertension(high blood pressure) ☐

Diabetes ☐

Epilepsy ☐ Other ☐

Asthma ☐ please specify: _____

Bronchitis: ☐ _____

Kidney disease ☐ _____

Are you presently taking any medication? check one ☐ yes ☐ no

If "yes", specify kind(s) and purpose (or for what condition)

Do you smoke? check one ☐ yes ☐ no

If "yes" specify number of cigarettes per day:

up to 20 _____ 21 - 30 _____ 31 - 40 _____ over 41 _____

Other tobacco product(s) used: _____ amount per day: _____

Previous Activity. Please indicate how much regular exercise you participated in during the past six months, before joining this class (check one in each column).

0 days per week _____	5 - 15 minutes per session _____
1 day per week _____	20 - 40 min. per session _____
2 days per week _____	45 min. - 1 hour per session _____
3 days per week _____	1 - 1½ hours per session _____
4 days per week _____	2 - 2½ hours per session _____
5 days per week _____	over 2½ hours per session _____
6 days per week _____	
7 days per week _____	

How many Y.M.C.A. classes have you attended in the past year? _____

Check the type of activity you were referring to in the last question (you may check more than one), and fill in distance, time and kind, if known:

Walking _____ distance: _____	Bicycling _____ (standard)
time: _____	_____ (stationary)
Jogging/Running _____ distance: _____	distance: _____
time: _____	time: _____
Tennis _____ singles: _____ doubles _____	Y.M.C.A. exercise class _____
time per set: _____	Specify: _____
Indoor racquet sports _____	Y.M.C.A. sports class _____
singles: _____ doubles: _____	Specify: _____
time per game: _____	
Swimming: _____ stroke: _____	
distance/laps: _____	
Other _____; please specify _____	

Reasons for attending this class: designate 1st, 2nd and 3rd reason by importance:

Improve physical fitness _____	Influence by friends/relatives _____
Improve appearance _____	Take advantage of Y.M.C.A. membership _____
Lose weight _____	
Meet other people _____	
Other _____; please specify, _____	

Next of kin: _____ Relationship: _____
 address: _____
 phone number: _____

APPENDIX B

CONSENT FORM I, HEALTH INSTRUCTION PROGRAM

I, _____, agree to participate in
the program offered by Mrs. Janet L. Cox of the Division of Health
and Safety, The University of Tennessee, as a part of the West Side
Y.M.C.A. class for which I have enrolled.

The program consists of a series of mini-lectures on various aspects of exercise, including physiological effects on the heart, respiratory system responses, nutrition, diet and weight control, appropriate clothing, effects of weather, etc., to be presented for approximately 5 minutes during the exercise class. Furthermore, I agree to supply personal data which I understand will be kept confidential and will be reported in such a way that no one individual can be identified. I also understand that I may be contacted in the future for updated information. I understand that there will be no risks or side effects from the program itself, and that neither Mrs. Cox, the Division of Health and Safety, or The University of Tennessee, Knoxville, is responsible for risks incurred from the exercise part of the class.

I have been informed that I may withdraw from the program at any time without jeopardizing my participation in the Y.M.C.A. class.

Signature: _____

Mrs. Janet L. Cox
Division of Health and Safety
1914 Andy Holt Avenue
The University of Tennessee
Knoxville, TN 37916
974-5041

CONSENT FORM II, GROUP COUNSELING PROGRAM

I, _____, agree to participate in
the program offered by Mrs. Janet L. Cox of the Division of Health
and Safety, The University of Tennessee, as part of the West Side
Y.M.C.A. class for which I have enrolled.

The program consists of meeting with a group during the last 5 minutes of the exercise class. The purpose of these meetings will be to discuss various aspects of becoming involved in a regular exercise program and to find solutions to any problems which may arise which prevent continuing exercise. Furthermore, I agree to supply personal data information which I understand will be kept confidential and will be reported in such a way that no one individual can be identified. I also understand that I may be contacted in the future for updated information. I understand that there will be no risks or side effects from the program itself, and that neither Mrs. Cox, the Division of Health and Safety or The University of Tennessee, Knoxville, is responsible for risks incurred from the exercise part of the class.

I have been informed that I may withdraw from the program at any time without jeopardizing my participation in the Y.M.C.A. class.

Signature: _____

Mrs. Janet L. Cox
Division of Health and Safety
1914 Andy Holt Avenue
The University of Tennessee
Knoxville, TN 37916
974-5041

APPENDIX C

INSTRUCTIONAL PROGRAM, MINI-LECTURE OUTLINE

Lesson I. Introduction

1. Fitness
 - a. components--cardiorespiratory function, relative leanness, low back function, relaxation/arousal balance
 - b. general definition--aerobic versus anaerobic fitness

Lesson II. Factors influencing training effect

1. General recommendations--exercise regularly, start gradually, progress, warm-up, taper down
2. Frequency
3. Duration
4. Intensity
5. Progressive overloading

Lesson III. Responses to exercise training

1. Circulatory system--heart
 - a. heart rate--pulse
 - b. stroke volume
 - c. cardiac output
 - d. blood pressure

Lesson IV. Responses to exercise training

1. Respiratory system
 - a. ventilation
 - b. proper breathing technique during exercise

Lesson V. Responses to exercise training

1. Body composition
2. Ideal percent body fat
3. Estimated measurement of percent body fat

Lesson VI. Energy balance

1. Definition--overweight, obesity, overfat
2. Caloric intake-expenditure balance
3. Consequences of obesity

Lesson VII. Weight control and nutrition

1. Hints to good nutrition
 - a. proper diet composition
 - b. recommended changes in typical American diet
 - c. suggested substitutes

Lesson VII. (Continued)

2. Weight control
 - a. diet changes
 - b. role of regular activity

Lesson VIII. Responses to exercise training

1. Muscular system
 - a. response of muscles
2. Lower back and abdominal strengthening exercises

Lesson IX. Stress

1. Definition/manifestations
2. Theory of life changes
3. Coping techniques
4. Relaxation exercises

Lesson X. Coronary heart disease and exercise

1. Risk factors for Coronary Heart Disease
2. Evidence of benefit of exercise

Lesson XI. Practical considerations

1. Proper attire
2. Where--when to exercise
3. Warm-up, taper down--recommended stretching exercises

Lesson XII. Practical considerations--environment

1. Exercise in the cold
 - a. factors: temperature, wind, sun
2. Exercise in the heat
 - a. factors: degrees, humidity, air movement, exercise effort
 - b. protective measures: fluids, acclimatization

Lesson XIII. Problems

1. Soreness/injury
 - a. most common problems
 - b. preventive measures

APPENDIX D

CONSENT FORM III, INFORMATION GROUP

I, _____, agree to provide some
print name
personal data and physical activity information to Mrs. Janet L. Cox
of the Division of Health and Safety, The University of Tennessee,
as part of a study being conducted at the West Side Y.M.C.A. I
understand that this information will be kept confidential and will
be reported in such a way that no one individual can be identified.
I also understand that I may be contacted in the future for updated
information. I understand that neither Mrs. Cox, the Division of
Health and Safety, or The University of Tennessee, Knoxville, is
responsible for risks incurred from the exercise class.

I have been informed that I may withdraw my support for the study at any time without jeopardizing my participation in the Y.M.C.A. class.

Signature: _____

Mrs. Janet L. Cox
Division of Health and Safety
1914 Andy Holt Avenue
The University of Tennessee
Knoxville, TN 37916
974-5041

APPENDIX E

FOLLOW-UP QUESTIONNAIRE

_____ check for verification

_____ Name: _____

Code:

_____ Address: _____

_____ Session

_____ Class

_____ Time

_____ Phone: home _____
 business _____

_____ Height: _____

_____ Occupation:
 _____ full time _____ part-time

_____ Weight: _____

changes:

_____ Medical History:
 changes:

Number of children _____

Ages: _____

_____ Medications:
 changes:

_____ Smoking habits:
 changes:

Activity since conclusion of class: at 6 months

Date: _____

0 days per week _____

5 - 15 min. per session _____

1 day per week _____

20 - 40 min. per session _____

2 days per week _____

45 min - 1 hour per session _____

3 days per week _____

1 - 1½ hours per session _____

4 days per week _____

2 - 2½ hours per session _____

5 days per week _____

over 2½ hours per session _____

6 days per week _____

7 days per week _____

at 6 months

at 6 months

Type of activity:

days per week

Walking: Time: _____
distance: _____Bicycling: standary _____
stationary _____Jogging/Running: time: _____
distance: _____distance: _____
time: _____Tennis: Singles _____
Doubles _____
time per set _____

Indoor racquet sports

Singles _____

Doubles _____

time per game: _____

Swimming: Stroke _____
distance or laps _____

YMCA exercise class

Other, specify: _____

Specify:

Session:

YMCA sports class

Specify:

Session:

COMMENTS:

Weeks skipped: Number _____
When _____

Reasons:

at 10 months

Date: _____

0 days per week _____

5 - 15 min. per session _____

1 day per week _____

20 - 40 min. per session _____

2 days per week _____

45 min. - 1 hour per session _____

3 days per week _____

1 hour - 1½ hours per session _____

4 days per week _____

2 - 2½ hours per session _____

5 days per week _____

over 2½ hours per session _____

6 days per week _____

7 days per week _____

at 10 months

Type of activity:

days per week

Walking: time _____
distance _____Bicycling: standart _____
stationary _____Jogging/Running: time _____
distance _____time: _____
distance _____

at 0 months

____ Tennis: singles ____
 doubles ____
 time per set: ____

____ Swimming: stroke: ____
 time: ____
 distance/laps: ____

____ Other, specify: ____

____ Indoor racquet sports:
 singles ____
 doubles ____
 time per game: ____

____ YMCA exercise class

Specify:
 Session:

____ YMCA sports class
 Specify:
 Session:

COMMENTS:

Weeks skipped: Number ____
 When ____

Reasons:

At 10 months:

Adherers:

1. Main reason(s) for continuing exercise

☐ keep physically fit	☐ influenced by others
☐ keep up appearance	☐ Y.M.C.A. membership
☐ lose weight	☐ other; explain

2. What were the reasons or things that caused you to miss sessions?

Did you usually make up sessions?

3. What do you find the most difficult part of exercise?

Nonadherers:

4. What were the reasons why you were unable to continue exercise? (e.g., lack of time, did not enjoy, illness/injury, no convenient class)

5. Did you attempt a regular exercise program on your own after the class?

If so, what happened?

Both:

Describe your feelings about exercise:

Contract Group:

Have you used your contract? How?

APPENDIX F

BEHAVIOR CHANGE PROGRAM OUTLINE

- I. Select target behavior(s)
 1. examine and evaluate current behavior
 2. define goal(s)
 3. written commitment
- II. Develop plan of action
 1. alternative plans--brainstorming
 2. select first weekly plan
 3. written commitment
- III. Evaluate progress
 1. review weekly plan--keep, alter, delete, add
 2. written commitment--week #2
- IV. Checks
 1. report each week
 - a. continue evaluation of weekly plans; modify as necessary
 - b. monitor progress toward long range goal(s)
- V. Additional behavior change techniques
 1. principles of behavior change/modification (review)
 2. reinforcement
 3. extinction
 4. tokens
 5. punishment
 6. time out
- VI. Final Commitment
 1. written contract--goal to continue exercise program over next year
 - a. specify: what, when, how much

APPENDIX G

GOAL SETTING

Date: _____

My goal(s) is (are):

.

Signature: _____

Signature: _____

W E E K L Y P L A N

Week of _____

In working towards my goal, this week I will:

- 1.
- 2.
- 3.
- 4.
- 5.

Signed: _____

APPENDIX H

FINAL PROJECT

There is one final commitment which I would like you to make as the end of this session approaches. You should now be aware of what it "takes" for you to make a goal and work toward it. I hope the experience you have had will help you in this final endeavor. This commitment involves continuing the improvements in fitness you have made through your Y.M.C.A. class participation by developing a personal exercise program which you will follow over the next year. It can involve Y.M.C.A. classes, other community classes, and exercise and sports you would do on your own, on a regular basis. Therefore, between today and our next meeting, I would like you to plan (in detail) your own exercise program. I suggest devising your plan by season (see next page). Keep in mind that you should be exercising 3 to 4 times per week, for a minimum of 20 to 30 minutes of rigorous activity or 60 minutes of moderate activity.

EXAMPLE:

Spring (April to mid-June):

1. fitness class Y.M.C.A., Tues. and Thurs. 5:15-6:30
2. make up days: walk-jog-walk 30 minutes around neighborhood
3. swimming Y.M.C.A., Wed., 5:15, 40 minutes

Summer (June to August):

1. tennis singles, 2 days per week with Jane Doe, Tues. and Thurs. for 1-1½ hours
2. walk-jog-walk, 40 minutes around neighborhood, 1 to 2 days per week
3. rain days: jump rope 3 minutes/rest/3 minutes/rest . . . for 30 minutes

Fall (Sept. to Oct.):

1. walk-jog-walk, 45 minutes around neighborhood, 1-2 days per week
2. tennis singles, 2 days per week, Tues. and Thurs. for 1-1½ hours

Winter (Nov. to March):

1. swimming at Y.M.C.A., 45 minutes, Mon. and Wed.
2. aerobic dance class at Y.M.C.A., Tues. and Thurs., noon to 12:45
3. make-up session: jump rope (same as above)

If part of your plan includes a Y class, be sure to devise an exercise session for missed classes, the weeks between sessions or for an additional day (if you only attend class 2 days per week). This plan should be an ideal exercise routine, one you would likely follow. I'll be around after your classes next week for any questions or help I can give. Once you have a final plan, fill in the next page. You keep the rough copy and I'd like the attached form.

We'll meet briefly next week to review your plan and for you to finalize your commitment.

MY EXERCISE PLAN

NAME: _____

SPRING (April to mid-June):

SUMMER (mid-June to August):

FALL (September to November):

Winter (December to March):

COMMENTS OR EXPLANATIONS:

APPENDIX I

EXERCISE CONTRACT

I, _____, agree to abide by the attached exercise plan which I developed for the next 12 months. Adjustments can be made in the activities themselves, however, the frequency, duration and intensity of the original exercise routine will remain comparable.

Signed: _____ Date: _____

Signed: _____

APPENDIX J

SUMMARY OF REASONS FOR ADHERENCE OR NON-ADHERENCE TO EXERCISE PROGRAM

At the ten-month follow-up contact, a series of questions (see Appendix E) were asked each subject in order to obtain some insight into their perceived benefits to continuing an exercise program, specific problems which caused interruptions in their normal exercise schedule, reasons for discontinuing regular exercise and general feelings about exercise. It is not always the most scientifically obtained data that provides clues to the problem of adherence to leisure time physical activity programs. Consideration of subjects' comments or observations may lead to solutions or alternative ways of approaching the problem. Responses of similar nature or meaning were combined into categories. The following is a summary of the responses given.

Question #1: Main reason(s) for continuing exercise.

1. To control, lose or maintain weight (30).
2. To feel better (e.g., more alert, more positive, feel better about oneself, feel better physically and mentally) (27).
3. To keep physically fit (20).
4. To tone up the body (11).
5. It feels good (11).
6. To become healthier (including any response about health) (10).
7. To increase energy level (9).

8. To combat or relieve a specific health problem (e.g., depression, migraines, stress, menstrual cramps) (9).
9. It is enjoyable (8).
10. To improve mental function (7).
11. To improve appearance (5).
12. To be with people (3).
13. It is a personal achievement/accomplishment (3).
14. To keep busy (2).
15. It is a habit (2).
16. To get into shape for another activity (1).
17. To increase stamina (1).
18. To expend excess energy (1).
19. To be outdoors (1).
20. To stay in-tune with body (1).

Question #2: What were the reasons or things that caused you to miss sessions?

1. Illness (personal or family) (27; 2 seldom).
2. Adverse weather conditions (25).
3. Family responsibility or meetings or activities (18).
4. Working problems, e.g., work late or travel (16).
5. Meetings (not family oriented, rather appointments or outside family functions) (15).
6. Laziness or did not take time (13).
7. Other specific reasons (chores, traffic, slept late, feeling bad, holidays, husband's day off, poor environmental conditions, need a break from exercise) (12).

8. Social activities (7).
9. Traveling or out of town (7).
10. Child care problems (3).
11. Tired (3).

Did you usually make-up sessions?

No (48) Yes (14) Sometimes (8)
 Tried (4) Don't ever miss (1)

Question #3: What do you find the most difficult part of exercise?

1. Some physical aspect; specifically, lack of strength for some dance movements, lack of coordination, lack of endurance, speed running, running, breast stroke, jumping, working abdominal muscles, holding a position, stretching, etc. (23).
2. Getting started or getting there (21).
3. Nothing (7).
4. Finding time (6).
5. Going back out (after work, lay-off or in evenings) (5).
6. Maintaining self-discipline of exercising on own (5).
7. Exercising alone (4).
8. Staying regular or in a routine (4).
9. Not planning a specific time (3).
10. Getting mentally prepared (3).
11. That it didn't get any easier (2).
12. Going out in bad weather (1).
13. Exercising at Y.M.C.A. rather than doing sports (1).
14. Trying not to overdo (1).

15. Having freedom to exercise (babysitting) (1).
16. Finding a place to exercise (1).
17. Exercising when not feeling well (1).

Question #4: What were the reasons why you were unable to continue exercise?

1. Lack of time (10).
2. Weather conditions (7).
3. Medical problems (4).
4. Laziness (3).
5. Change of work time (3).
6. Pregnancy (3).
7. Didn't start back after the holidays (2).
8. Other (1 each), specifically, no place to exercise, fear after dog attacked, lack appropriate winter clothes, lack of money for class, car trouble, lack of motivation, traveling.

Question #5: Did you attempt a regular exercise program on your own after the class?

Yes (10) No (13)

If so, what happened?

1. Adverse weather conditions.
2. Need structured program.
3. Need commitment.
4. Holidays interfered.
5. Pregnancy.
6. Family problems.
7. Back problems.

Describe your feelings about exercise:

Positive (67) Negative (3) Both (15)

Positive:

1. Enjoyment/Fun/Love it/Great/Like it/Joyful (40).
2. Feels good/I feel better (physically, mentally and emotionally)/Healthier (38).
3. Very important/Vital/Necessary/Beneficial/Good for me (24).
4. Remarks regarding specific results of exercise, e.g., releases tension, increases energy, relaxing, is an accomplishment (18).
5. Comments regarding physicalness of exercise, e.g., it is work, keeps me in shape, enjoy dance, enjoy ways the body works, enjoy sports (16).
6. Miss it/Can't wait to get back into it/Wish I could (8).
7. Need scheduled time/Class/Hard to stay in regular routine (6).
8. Everybody should (5).

Negative: These subjects made only negative comments.

1. Not a favorite thing to do, but has to be done (1).
2. "For the birds," for me personally (1).
3. Dull (1).

Both: These subjects commented positively on the overall worth of physical activity, but had negative comments as well, e.g.,

1. Enjoy dance, sports, but not calisthenic type exercise (3).

2. Don't like to exercise, but class is fun (3).
3. Did not see carry-over effect, i.e., increase energy for daily tasks (2).
4. Did not help with headaches, it is not reinforcing (1).
5. Feel tired when I think about exercising (1).
6. Hard to get into a routine (1).
7. Problem with motivation (1).
8. Don't ever look forward to it (1).
9. Enjoy it when it is over; it is a chore, necessary evil (1).
10. Painful when exercise alone or in poor environmental conditions (1).

To counseling group: Have you used your contract? How?

Yes (1).

No (6).

Yes, but only at first (3).

Kept it in mind (1).

Kept it on display, but didn't use it (1).

VITA

Janet Lynn Cox was born in Ogden, Utah on September 28, 1948. She attended parochial elementary school and two years at Elizabeth Seton Catholic High School. She was graduated from Bladensburg Senior High School in June, 1966 and entered Frostburg State College, Frostburg, Maryland, the following fall. She was graduated with a Bachelor of Science degree in Health, Physical Education and Recreation in June, 1970.

Beginning her teaching career in Prince George's County, Maryland school district, she taught girl's physical education for three years and General Science for one year at New Carrollton Junior High School. In the fall of 1973, she and her husband, Ronald H. Cox, moved to Boone, North Carolina. She worked for Appalachian State University while her husband pursued his Master of Arts degree in Psychology. Again, in the fall of 1974, she and her husband moved to Knoxville, Tennessee where she worked in the Undergraduate Admissions Office at The University of Tennessee. In the winter of 1975, she entered the Master's program in Health and Safety as a part-time student. She earned her Master of Science degree in School Health Education in December, 1976. In the fall of 1978, she became a full-time student in the Division of Health and Safety's Doctor of Education program and was a graduate teaching assistant in the Division for three years. In the course of completing her dissertation, she had two children, Travis and Kyle, and began working as Assistant Coordinator at the

Knoxville-Knox County senior citizens center. She is presently manager of the Retired Senior Volunteer Program at the Office on Aging. She earned her Doctor in Education in December, 1985. She is a member of the Honor Society of Phi Kappa Phi and Eta Sigma Gamma, professional Health Honorary.