The Impact of an Adult Health Education Program on Exercise Self-Efficacy and Participation in Leisure-Time Physical Activity.

by

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ABSTRACT

Low participation in and poor adherence to regular exercise presents a major challenge for health promotion programs. A growing body of evidence suggests that health education programs that are developed using the principles of Bandura's (1986) Self-Efficacy Theory have shown success in maintaining a variety of health related behaviors. Exercise behavior however, is often more time consuming and requires more effort than most other health related behaviors, thus it remains to be seen whether adult health education programs which are intended to develop exercise self-efficacy, will indeed increase participation in, and adherence to regular exercise.

After reviewing the available literature, an adult health education program was developed by the researcher that combined the principles from Bandura's (1986) theoretical model of Self-Efficacy, with concepts and intervention strategies drawn from the literature in adult education, health education and exercise psychology. Green and Kreuter's (1991) Precede-Proceed framework, an outcome-based health education planning model was used for the planning, implementation and evaluation processes of this adult health education program in a community setting.

The purpose of this study was to investigate the impact of the intervention program on exercise self-efficacy and the participation in leisure-time physical activity at the end of the five week program and at the end of a five week follow-up period. Thirty nine female residents from U.B.C. Acadia Park family housing were recruited for this study. The subjects were
matched and paired and then randomly assigned to either an experimental or control group. Both groups received a five week program of nine, ninety minute sessions. The experimental group received a program that focused on the self-regulation of exercise behavior and the control group received a traditional health education program based on standard health information.

It was hypothesized that the experimental group would participate more frequently in exercise, and have higher exercise self-efficacy on completion of the five week program, and at the end of the five week follow-up period. The participation in exercise was measured using the 7-Day Recall Exercise Behavior Questionnaire (Godin and Shephard 1985) and exercise self-efficacy was assessed using the Exercise Self-Efficacy Scale (Marcus et al. 1992). The data were analyzed using a two way analysis of variance, group (two) by time (three) factorial design with repeated measures on the second factor for each dependent variable. In addition, Green and Kreuter’s (1991) Proceed evaluation framework was used to describe how learning was applied following the intervention program.

The quantitative analysis indicated that the experimental group participated in a significantly higher frequency of exercise and had significantly higher levels of exercise self-efficacy at the end of the five week program and at the end of the five week follow-up period than the control group (p<0.001). The Proceed evaluation revealed that the participants differed in their understanding of the self-regulatory strategies, their
adaptation of these strategies, previous experience with exercise motivation, stages and rates of exercise adoption, personal resources and perceived power, social support, and perceived exercise self-efficacy. The hypotheses were supported by the results of this study and suggest that a health education program that is based on Bandura's (1986) theory of self-efficacy and that focuses on the self-regulation of exercise behavior is effective for increasing and maintaining leisure-time physical activity.
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CHAPTER 3

INTRODUCTION

During the last century in industrialized countries there have been dramatic changes to peoples' lifestyles which have had a profound effect upon the status of their health. Notably, one of those changes has been the significant reduction in daily energy expenditure as a result of the use of:

(1) technology, in the home and in the workplace.
(2) mechanized transportation.

This has contributed to the increase in hypokinetic diseases e.g., premature death due to cardiovascular disease, colon cancer in males, low back pain, anxiety, depression, and low bone density in post-menopausal women (Bouchard, Shephard, Stephens, Sutton, and McPherson 1990) seen over this period. Studies suggest however, that both physical fitness and habitual physical activity are inversely related to coronary heart disease risk in adults (Powell, Thompson, Casperson and Kendrick 1987; Morris, Everett and Semmence 1987), although the impact of each factor on coronary heart disease remains to be determined.

The benefits of regular exercise have been recorded both physiologically (Bouchard et al. 1990) and psychologically (Biddle and Mutrie 1991). However, in order to attain the physiological benefits of exercise, the American College of Sports Medicine (1990) guidelines recommended that aerobic
exercise should be performed at an exercise intensity of 60–90% of maximum heart rate, and at a frequency of 3–5 times each week, for a duration of 15–60 minutes each time.

Studies have shown that despite a greater public awareness of the importance of exercise, in industrialized countries as little as 8–20% of the population are sufficiently active to attain maximum health benefits, while 30–59% are essentially sedentary (Stephens, Jacobs & White 1985; Centers for Disease Control 1990). In addition, Dishman (1991) reported that the typical dropout rate from exercise programs around the world, has remained at roughly 50% within the first 6 months.

There are various levels and stages of involvement in exercise participation. The Transtheoretical Model for the stages of behavior change (Prochaska and DiClemente 1985) has been shown to apply to certain health behaviors (cessation of smoking, alcohol and drug use). Marcus, Selby, Niaura and Rossi (1992) adapted this model to exercise participation and proposed that individuals move sequentially through the stages of: Precontemplation (no intention of exercising regularly), Contemplation (intention to exercise regularly), Preparation (not only thinking about doing exercise, but has started a limited amount of it), Action (recently involved in regular exercise as recommended by the American College of Sports Medicine 1990), and Maintenance (engaged in regular exercise for at least six months). Within each behavior change stage, an individual experiences ten principle processes of change: consciousness raising, self-liberation, dramatic relief,
environmental reevaluation, helping relationship, stimulus control, counter-conditioning, social liberation, self-reevaluation, and reinforcement management (Prochaska and DiClemente 1985). In an effort to explain the complexity of exercise adherence, Dishman (1990) proposed a life-span interaction model that takes into account diverse disciplines (psychological, physiological and socio-environmental) and identifies a number of determinants.

One of the problems however, with the literature on exercise adherence is that it is often implied that dropping out of a specific exercise situation results in a sedentary lifestyle. An individual may cease in one exercise situation but go on to continue in another exercise pursuit depending upon personal preferences or seasons etc. In criticism of the high relapse rates reported in the literature, Lovato and Green (1990) noted that bias may be caused by the self-selection of relapse-prone subjects into experimental studies, and also by the tendency for subjects to inflate post-program behavioral improvements to satisfy the experimenter. Nevertheless, the health-related benefits of exercise are of limited use if adoption and adherence rates remain low. Therefore, exercise adherence is rapidly becoming one of the most frequently researched concepts in exercise psychology.

The motivational process is clearly an important component of exercise adherence. People have many different motives for taking part in physical activity. The Canada Fitness survey (1983) data supported the view that reasons for being active are
strongly health related. Sixty percent reported that to "feel better" was a "very important" reason for being active. Other motives for being active reported in this study included: fun, excitement, fitness, social interaction, weight control, improved flexibility and stress management. Gauvin (1990) concluded that individuals who exercise regularly have two streamlined reasons for participating in regular exercise and physical activity, namely, fitness and looking good. Ashford and Biddle (1990) found that participants over 25 years of age were much more likely to report motives associated with health and relaxation than were younger subjects. Thus, it would appear that physical fitness and well being appear to be central motives for participation in regular exercise. Although, Dishman (1988), suggested that health factors may be important motives in the initiation stage but exercise adherence is more likely to be related to imminent sensations of enjoyment and well-being.

Intervention approaches to enhance exercise adherence have been shown to be effective when focusing on the use of self-regulation techniques in regard to exercise behavior. In addition, health education programs that have been based on Bandura's (1986) self-efficacy theory have been successful in maintaining a variety of health behaviors (Strecher, Devellis, Becker and Rosenstock 1986). Inherent in the theory of self-efficacy is the idea that people are capable of self-regulating their own behavior. Exercise behavior however, is often more time consuming and requires more effort than other health behaviors. The literature has not as yet established whether
health education programs that are developed using Bandura's principal components of self-efficacy will increase the participation in and maintenance of leisure-time physical activity.

Therefore the objectives of this study were:

(1) to investigate the impact of an adult health education program on the frequency of participation in aerobic exercise at the end of the five week program and at the end of a five week follow-up.

(2) to investigate the impact of an adult health education program on exercise self-efficacy at the end of the five week program and at the end of a five week follow-up.

(3) to measure the stages of exercise behavior change at the start of the program and at the end of the five week program.

(4) to describe the educational experience using the Green and Kreuter (1991) framework.

The program was developed by the researcher and was based on planning, implementation and evaluation concepts from the literature in adult education and health education while the content for the program was based on Bandura's self-efficacy theory and intervention strategies from exercise psychology.
Definition of Terms

Health Promotion
The combination of educational and environmental supports for actions and conditions of living conducive to health (Green and Kreuter 1991).

Health Education
Any combination of learning experiences designed to facilitate voluntary actions conducive to health (Green and Kreuter 1991).

Lifestyle
Lifestyle comprises the aggregate of an individual’s behaviors, actions, and habits (Bouchard et al. 1990).

Physical Activity
Any bodily movement produced by skeletal muscles and resulting in energy expenditure (Bouchard et al. 1990).

Exercise
Exercise is leisure-time physical activity which a person chooses to undertake during his or her discretionary time with the intention of developing physical and/or physiological fitness (Bouchard et al. 1990).
Unsupervised Aerobic Exercise
Health related exercise which incorporates the rhythmic contraction of major muscle groups: brisk-walking, jogging, cycling, swimming, exercise bicycle and stairmaster activities.

Self-Efficacy
This is a specific belief in one’s ability to perform a particular behavior (Bandura 1977). The Self-Efficacy construct has been predictive with regards to many health behaviors and is a necessary predecessor to behavior change (Bandura 1986). The Exercise Self-Efficacy Scale used in the current research was developed by Marcus et al. (1992).

Self-Regulation
Self-regulation implies the solitary pursuit of goal directed behavior without immediate external control, while minimizing the limitations imposed by one’s physical and social environment (Kirschenbaum and Wittrock 1984).

Cognitive Behavioral Skills
These are the individual techniques which enhance the self-regulation of exercise behavior, and include: motivational aids, goal setting, time management, self-monitoring, tension control, imagery, attention control, and positive thinking (Biddle and Mutrie 1991).
CHAPTER 2
LITERATURE REVIEW

Introduction

The following review focuses on the literature in exercise psychology, health education and adult education pertaining to programs that are intended to increase participation in and adherence to leisure-time physical activity. The review begins with a discussion regarding the potential role of self-efficacy and the self-regulation of exercise behavior. Traditional and contemporary health promotion and education approaches are examined. Behavior modification techniques intended to increase exercise adherence are reviewed followed by considerations regarding the development of a cognitive-behavioral skills education program. The review is completed by examining the concepts and principles for effective adult education.

Exercise self-efficacy and self-regulation

A growing body of literature addresses the problem of adherence in an exercise setting from a situational perspective focusing on social-cognitive approaches (Sallis, Haskell, Fortmann, Vranizan, Taylor and Solomon 1986; Garcia and King 1991; McAuley, Courneys and Lettunich 1991; McAuley and Jacobson 1991; and Marcus et al. 1992).

Bandura (1977, 1986) postulated the existence of a key motivational construct in the social-cognitive theory of human thought and action which he termed "self-efficacy". Bandura
differentiated between efficacy expectations and outcome expectancies. Efficacy expectations refer to an individual's belief in his or her own capability to perform a specific task successfully (e.g., the participation in regular exercise), whereas outcome expectations refer to one's belief that a particular behavior will produce a particular result (e.g., regular exercise participation will reduce anxiety).

Consequently, exercise efficacy expectations influence the activities chosen, the effort expended, the degree of persistence exhibited in the face of obstacles or barriers, emotional reactions (e.g., joy, anxiety, etc.), and are therefore subject to change as a function of environmental factors. Thus, high efficacy beliefs regarding one's capability to participate successfully and adhere to exercise would lead to positive mastery experiences which in turn should influence one's future exercise participation and expectations depending upon the outcome of those mastery experiences.

Schunk and Carbonari (1984) suggested that a strong sense of efficacy for behaving in a healthful fashion is central to the self-regulation of one's life. Self-regulation can be described as a self-oriented feedback loop involving a variety of complex interactions between systematic and continuous self-observation of performance, cognitions, emotional states, physiology and environmental constraints (Zimmerman and Schunk 1989). Therefore, self-regulation incorporates diverse cognitive-behavioral skills where an individual is able to monitor the effectiveness of his or her strategies and respond
to this feedback by changes in self-perception (e.g., imagery selection) or changes in behavior (e.g., time management), thus becoming active participants in their own learning. According to Weber and Wertheim (1989), poor self regulatory strategies for overcoming barriers are a main reason why many people who intend to be active remain sedentary.

There are many reasons for not exercising given by those who intend to exercise regularly, but who do not. It appears that a number of real and perceived barriers including inconvenience, inaccessible locations, exercise boredom, activity cost, work conflicts, lack of self-motivation, and a lack of time or energy tend to hinder long-term exercise participation. Biddle and Mutrie (1991) suggested, however, that adequate self-regulatory strategies in the form of cognitive-behavioral skills (e.g., time management, goals setting, tension control, imagery) for overcoming these barriers, can increase self-efficacy and therefore reduce the difficulty that people experience in adhering to regular exercise. Alternatively, inadequate self-regulatory strategies can lead to decreased feelings of self-efficacy, a period of inactivity, and possible feelings of guilt and lack of control, which in turn could increase the probability of sustained inactivity. Thus, self-efficacy is considered to be an important factor in maintaining habitual physical activity, especially in the face of adverse environments or lack of social support. Bouchard et al. (1990) concluded that active people tend to be well-motivated to persist with exercise, and possess problem-solving skills which
focus on self regulatory strategies that can be learned (goal setting, exercise strategies, minimizing environmental barriers to implementation, and monitoring and reinforcing their actions).

In a literature review regarding self-efficacy and health behavior change, Strecher et al. (1986) found a consistently positive relationship between self-efficacy and health behavior change and maintenance. Thus, it would appear that self-efficacy offers a direction for re-conceptualizing the planning of health education programs as well as the measurement of the effects of these programs on behavior change.

Health promotion approaches to physical activity

The World Health Organization has identified one of its targets for the year 2000 as the provision of health education programs which should enhance the knowledge, motivation and skills of people to acquire and maintain health (WHO 15). This is an encouraging statement since, clearly, a major challenge facing health promotion is to increase the participation in and adherence to regular exercise. According to Steuart (1993, p.53), "health education should be concerned with all conceivable ways of inducing health related behavior change associated with which the actual health status of individual, family and community is improved. The influence-attempts of health education are brought to bear on behaviors that, in themselves, lie within culturally defined "normal" limits."
Traditional health education approaches to increase physical activity, however, are often based on medical or fitness screening, health risk appraisals, or efforts to educate people concerning the guidelines for exercise prescription. These approaches have tended to stimulate initiation of an activity program but do not tend to sustain participation (Dishman 1991). This may be because this type of program focuses on how to prevent ill-health and on abstract concepts of health or longevity, rather than the specific biological aspects of exertion such as perceptions and sensations that may prompt and reinforce activity or inactivity in some people. Hardy and Rejeski (1989) concluded that the psycho-physiological consequences that occur during or closely following exercise behavior are likely to be much more powerful influences on subsequent participation than those that do not occur until sometime in the distant future.

Additionally, exercise behavior is often more time consuming and effortful than most other health related behaviors that are targeted for change. Thus, it would seem that education strategies to increase and sustain physical activity levels should focus on positive health (i.e., well-being and fitness) and acquiring self-regulatory cognitive and behavioral skills which will enhance the psychological outcomes and sustain involvement in habitual physical activity. Vertinsky (1992) suggested that health promotion approaches should move from intervention to involvement, and ultimately focus upon empowerment and an improved quality of life.
Green and Kreuter's (1991) Precede-Proceed Model is a contemporary approach to health education planning and evaluation (Appendix G). This framework is based on the idea that people have the ability to influence their own health status and therefore encompasses the ideology and concepts of self-efficacy theory. The Precede-Proceed framework takes into account the multiple factors that influence health status and therefore provides direction for the planning of multiple approaches for health education programs. The Precede planning phase of the model generates specific objectives based on the needs and circumstances of the individual, while the Proceed phase is a realistic and flexible evaluation of these criteria and assesses whether and how learning was applied following health education programs. This framework proposes three key related factors that influence the multidimensional process of change: predisposing factors are antecedents that provide the motivation for change (knowledge, beliefs, attitudes, values and perceptions); enabling factors are environmental conditions that facilitate or hinder change (skills, resources, access, convenience, cost and barriers); and reinforcing factors are subsequent to behavior and provide continued reward and incentive for the change to occur in practice (social forces, external and intrinsic rewards, recognition, and well-being). Thus, this multidimensional framework includes the characteristics of the learner and the context in which the change is expected to occur. There is a growing body of evidence to support the utility of this model in a variety of settings.
and it has broad implications for many forms of adult education (Houle 1992). Mullen, Hersey and Iverson (1987) compared the effectiveness of three models in explaining exercise behavior: Precede-Proceed, Theory of Reasoned Action, and the Health Belief Model. They found that the variance accounted for in physical activity level by these models were 58%, 57% and 57% respectively and concluded therefore, that the Precede-Proceed Model offers a useful framework to explain involvement in leisure-time physical activity.

**Behavior modification approaches to physical activity**

In a review of the behavior modification and exercise adherence literature, Leith and Taylor (1992) concluded that certain interventions designed to develop a variety of cognitive and behavioral skills have contributed significantly to increasing and maintaining physical activity levels (e.g., self-monitoring and feedback, Oldridge and Jones 1983, Martin, Dubbert, Katell, Thompson, Raczynski, Lake, Smith, Webster, Sikova and Cohen 1984, and Owen, Lee and Sedgewick 1987; decision making, Wankel, Yardley and Graham 1985; and relapse prevention training, Belisle et al. 1987). Atkins et al. (1984) compared different methods of cognitive and behavioral modification strategies (behavior modification, cognitive modification, cognitive behavioral modification, attention control and no treatment group) to increase adherence to a walking program for patients suffering from chronic obstructive pulmonary disease. They found that the most effective method was
the combined cognitive and behavioral modification. According to Kendzierski and Johnson (1993, p. 208), "the cognitive behavioral approach focuses attention not on the myriad of obstacles a would-be exerciser may face as he or she contemplates exercising at any given time, but on the thoughts the individual has in regard to these obstacles." Dishman (1991) reported that these techniques are usually associated with a 10-25% increase in frequency of participation.

Relapse Prevention Training (Marlatt and Gordon 1985) is an example of self-regulation and incorporates a variety of cognitive and behavioral strategies for behavior change. This was developed initially in an effort to explain the lack of adherence to abstinence in relation to addictions associated with smoking, alcohol and drugs. It is inferred that the process of exercise adherence may bear some resemblance to the relapse effect studied in these other health contexts. However, Knapp (1988) noted that unlike those other health behaviors, the desired exercise behavior is a low frequency yet desired behavior. Therefore the extent to which a parallel can be drawn between the two remains as yet unclear.

Relapse Prevention Training is based on acquiring coping strategies for unexpected disruptions which can interrupt or end previously continuous exercise. Marlatt and Gordon (1985) suggested that a lack of coping response will lead to a decrease in self-efficacy and therefore an expectancy of further relapse. This could lead to the abstinence violation effect (i.e., feelings of guilt and lack of control) and, depending upon the
degree, could sustain relapse. Therefore, the magnitude of these disruptions and the probability of relapse will be reduced if the individual develops self-regulatory skills.

Intervention studies have reported greater increases in both short-term frequency and long-term adherence to exercise for experimental groups who have received relapse prevention training than for control groups who received standard health information at the end of exercise classes (King and Fredericksen 1984; Belisle, Roskiess and Levesque 1987; King, Taylor, Haskell and Debusk 1988; and Vogel-Burger 1990). Marcus and Stanton (1993) did not support these findings, however, and called for more research to be conducted before conclusions on the efficacy of the relapse prevention model for increasing exercise behavior can be reached. The following are examples of cognitive-behavioral skills that have shown success in the self-regulation of exercise behavior and are incorporated into intervention strategies such as relapse prevention training.

**Cognitive-behavioral skills**

According to Bandura (1986), there are four main sources whereby self-efficacy can be developed: performance attainment, imitation and modelling, verbal and social persuasion, and judgments of physiological states. These principle components are embedded in the following cognitive-behavioral skills (drawn from exercise psychology and behavior modification) and provide the basis for which the intervention program for this study was developed (Appendix D).
Motivational aids

One of the many reasons given for dropping out of regular exercise is due to the lack of social support from significant others. This tends to act as negative reinforcement, but can be overcome by encouraging a partner to share the exercise commitment or enlisting social support from someone who has a positive attitude to exercise. Thow and Newton (1990) found that support is easily created when one attends a class meeting as part of an exercise plan. This creates a kind of supportive social network that can assist with the motivation to overcome barriers that prevent exercise participation. A decision-balance sheet can be used to identify a person’s motives and personal cost benefit analysis for participating in regular exercise. This can help people recognize the advantages and disadvantages of increasing their levels of physical activity. Wankel (1985) suggested that a decision balance sheet can also be used initially to help people identify the barriers that may prevent their goals from being achieved. A variety of exercise cues (e.g., reminders in diary, clothing prepared before hand and placed in a visible place, slogans or posters) placed at strategic places in one’s environment (i.e., stimulus control) may act as motivational prompts to increase the likelihood of exercise participation. Brownwell, Stunkard and Albaum (1980) used a poster campaign at prominent places in a workplace setting and found that this technique was successful for increasing the use of staircase activity rather than using the elevator.
Goal setting

Performance achievement and the feelings that accompany success are believed to be a main determinant of self-efficacy (Bandura 1986). Goal setting provides a means for directing behavior toward the achievement of tasks and therefore is a very effective method of increasing and maintaining motivation. Atkins et al. (1984) found that subjects who declared their goals in a public way, or by "contracting", had significantly higher levels of commitment and adherence to exercise than groups that did not sign agreements or declare targets. It is important to note however, that external reinforcements need to be gradually phased out to the point that the exercise behavior is being maintained by intrinsic reinforcement from the exercise experience itself. Cooper's (1982) aerobic points system was also shown to increase exercise adherence. This method allocated specific points for participating in different activities (depending upon the duration and intensity) such that the weekly goal was to score a total of 30 points. Effective goal setting begins with the identification of a long term goal (e.g., to brisk walk regularly for 20 minutes and at least 3 times per week) which is then broken down into intermediate and short term goals. Goals should be time-phased, specific, but be set in a flexible way so that they can be realistically and progressively achieved. Martin et al. (1984) showed that subjects who were encouraged to set their own flexible goals had a greater adherence to regular exercise than those subjects who had fixed goals. Flexible goal setting and time management ensures that
regular participation in exercise can be achieved without increasing self-imposed pressure to meet set deadlines or targets. This also tends to appeal to those people who do not respond to tightly structured plans.

**Self-monitoring**

Self-monitoring provides a valuable source of information regarding the progress towards the achievement of personal goals. According to Juneau, Rogers, Desantos, Yee, Evans and Bohn (1987), periodic monitoring and reviewing of exercise behavior can be a powerful means of positive reinforcement. Self-monitoring can take the form of; exercise diaries, heart rate monitoring, Borg rating of perceived exertion or feelings and thoughts evaluation etc. Exercise diary information typically includes: times, activity type, distances, effort, weather, mood state, and other subjective appraisals. To this extent however, self-monitoring can be onerous to some people and require yet further motivation in addition to that of the demands of exercise participation. Therefore less onerous alternatives without written requirements can include pulse rate monitoring to reinforce effort given, or mentally noting perceived exertion, thoughts and feelings. Rejeski and Kenney (1988) found that self-monitoring in the form of thoughts and feelings was a useful way to analyze and restructure negative thought patterns which could cause drop-out. Success in self-regulation is largely dependent on the accuracy of self-observation as this process provides the necessary information
to make appropriate changes and enhance performance. Zimmerman and Schunk (1989) note however, that self-regulation often requires more preparation time, vigilance, and effort therefore, unless the outcomes of these efforts are sufficiently attractive, people may not be motivated to self-regulate.

Time management

Perceived lack of time is a main concern for those who intend to exercise, but do not (Godin 1986). Shephard (1985) however, found no evidence to suggest that people who did not exercise had any less time than people who exercised. This may suggest that the problem is less about having time available but rather about making better use of available time through time management techniques. Weekly and daily time management is a very effective method of ensuring that regular exercise will take place and hence be part of a person's lifestyle. According to Buffone, Sachs and Dowd (1984), an advantage of exercising on specific days and even at specific times is that exercise becomes an integral part of a person's day and thus the likelihood of missing exercise is reduced as the habit becomes reinforced. Prioritizing is a major component of time management. The first step is to identify the fixed and desired commitments that one would like to fit into his or her daily or weekly schedule, and then place these in order of priority. Using a structured and detailed timetable, the person then fits these commitments into the timetable schedule on a priority basis. If no free time is available for exercise then
alternative methods of increasing existing activity time can be achieved e.g., walking or cycling either part or all of the way to work, using the stairs regularly rather than using an elevator, and walking during the lunch hour period.

**Tension control**

The judgment of physiological arousal and emotional states is an important source of self-efficacy information (Bandura 1986). Hagberg (1990) suggested that exercise is a natural release mechanism for effectively dealing with stress and tension. However, it is also a physical stressor, thus depending on the nature of the exercise session will determine whether or not this is perceived as a positive or negative stressor. It is widely believed that there is an inverted "U" relationship between physical performance and arousal levels. According to Albinson and Bull (1988), there is an ideal range of arousal at the center of this curve where one achieves an optimal performing state, though this will vary between situations and between people. At an optimal range of arousal, one's performance is characterized by rational, creative, relaxed and fluent movements, and efficient cognitions. As arousal further increases however, there is an associated performance decrement that is characterized by overload, tension, discomfort, reduced sensory acuity, narrowing of attentional focus, and negative emotions (Albinson and Bull 1988). Conversely, too little arousal can also produce a performance decrement. This is characterized by a lack of goals, frustration, boredom, lack of
stimulus and reduced efficiency. Therefore managing one’s level of arousal during exercise participation can affect the feelings that accompany the exercise experience. Hardy and Rejeski (1989) concluded that both effort perception and the feelings associated with such effort were important factors that could influence the perceived enjoyment, reinforcement and likelihood of maintaining habitual physical activity. There are many ways to control arousal levels using sensory input and relaxation methods. However, it requires regular practice to become proficient at managing one’s level of arousal. The following examples are effective methods for increasing or decreasing arousal levels. These will depend upon the person and the nature of the specific sensory stimulus during the participation in health related exercise:

(1) sounds / self talk / music in the exercise environment.
(2) sights / imagery / light or dark exercise environment.
(3) smells in the exercise environment.
(4) deep slow breathing.
(5) attention focus (dissociation strategies).
(6) speed of exercise movements (slow, rhythmic)

For example, one may feel less tension during a brisk walk by maintaining a constant sustainable speed, attending to pleasurable thoughts, or the fresh air and foliage of the surrounding environment, than focusing on negative emotions, the
exertion of the exercise experience, or focusing on one feature in the vicinity of the exercise session.

**Imagery**

Bandura (1986) suggested that self-efficacy can be developed by seeing and modeling other people of similar disposition who successfully perform the desired behavior. This tends to reduce the resistance that stems from the uncertainty of the outcome and allows the learner to extract the essential elements from the observation to adopt a new behavior. This can be very effective, especially, when learners are given the opportunity to coach each other. Imagery can be used as an effective method of modeling and can take the form of visual, verbal and kinesthetic images. Imagery refers to the process of using the imagination to create thoughts, images, sensations, and feelings (Albinson and Bull 1988). This technique can be used in many different ways and has been very successful with the use of athletes to improve their performance and increase their coping strategies to face errors (Vealey 1986). In a similar way, positive imagery can play a major role in exercise adherence. For example, a person could imagine a potential disruption to participating in exercise and then use imagery to imagine possible successful solutions that overcome this disruption. Second, a person may use imagery to reinforce his or her adherence to exercise by creating successful images of themselves with: muscle tone, slimness, and more energy if they adhere to regular exercise. Third, the use of imagery has an
important role to play in the thought processes that occur during participation in exercise. For example, one can dissociate to pleasurable thoughts and create the optimal performing state which is enjoyable, comfortable and evokes well-being.

**Attention control**

Attention control is the ability to select and focus one’s attention on the relevant information (sight, sounds, thoughts), while being aware of the non-relevant information but paying no attention to it i.e., letting those thoughts go out of one’s mind. Association and dissociation are attention strategies used during physical activity. In association, performers focus on their bodily sensations (respiration, temperature, muscular feelings and abdominal sensations etc.). Associating to one’s perceived level of exertion is likely to maintain appropriate intensity levels and self-pacing for performance related exercise, thus avoiding the negative consequences of fatigue or injury (Buffone et al. 1984). This is a very popular technique for athletes as it enables them to perform at maximum intensity without over-extension. However, in terms of health related exercise, the literature supports greater adherence when people dissociate and purposely cut themselves off from sensory feedback, and instead focus on distracting thoughts such as aspects of the route ahead, talking, singing, pleasurable or successful problem solving thoughts etc, (Martin et al. 1984). Johnson and Siegal (1992) examined the effect of different
association and dissociation techniques on effort perception. They found that groups who employed dissociation strategies during aerobic exercise perceived the effort to be a lot less during sub-maximal exercise than the group who used an association strategy. Thus it appears that dissociation strategies can enhance exercise adherence by reducing the perception of effort, the physical discomfort, and exercise boredom. Dissociation is most easily achieved at a gentle slow pace, once the body is locked into a steady state speed and the person is relaxed.

Positive thinking

Bandura (1986) suggested that situational factors dominate over personal trait factors in determining self-confidence. Confidence is task specific and can be described as a state of thinking, feeling, and behaving. Attributions are the way that people typically explain behavior. Thus in terms of exercise participation this can have a powerful effect on future emotions, thoughts and subsequent exercise behavior. For example, if people perceive that the reasons why they are inactive are due to factors beyond their control (e.g., lack of ability), they are likely to remain inactive. In contrast, if they attribute their lack of activity to controllable factors (e.g., ineffective time management, poor goal setting, and inappropriate focusing), they are more likely to feel confident and thus succeed at making changes in the future.
According to Kendzierski and Johnson (1993), cognitive behavior theory implies that to change behavior, one must first identify and then modify the maladaptive thoughts which support it. Verbal persuasion is identified as an important source of self-efficacy information. Wilkes and Summers (1984) found that personal self-talk and personal perceptions of the costs and benefits of exercise were an effective strategy for increasing exercise self-efficacy and influencing behavior. Buffone, Sachs and Dowd (1984) suggested that maladaptive self-statements that dwell on self-doubt or obstacles are detrimental to exercise adherence e.g., "I'm just not the active type" or "I've got no will power." Studies have shown that cognitive restructuring (re-phrasing negative statements to positive and attributing set-backs to unstable factors rather than stable personality characteristics) coupled with immediate re-scheduling of the missed walking/jogging session enhanced exercise adherence (Atkins et al. 1984; King et al. 1988). For example, "I can walk to work at least once each week", "I feel good after I have been exercising", "If I'm covered up, I can go out in any weather", or "its great to be outdoors and in the fresh air, whatever the weather". Gauvin (1990) concluded that exercise adherers tended to engage in positive and motivational self-talk while drop-outs and sedentary people engaged in negative and derogatory self-talk.
Developing a cognitive-behavioral skills education program

The question arises as to which specific components should be incorporated into a cognitive behavioral skills education program and how these components should be sequenced and integrated within the program. It is not known as yet however, which is the best technique for any particular person or situation. According to Dishman (1988) educated participants may respond best to complex goal setting and self-monitoring, while less educated participants may work best with single prompts.

Boutcher and Rotella (1987) suggested the following key ingredients of their four-phase psychological skills education program: analyze the nature of the task (e.g., the physiological and psychological benefits of exercise; knowledge about the components of physical fitness, the issue of exercise adherence, and the role of self-regulatory cognitive-behavioral skills); individual assessment (e.g., profiling using questionnaires, and self-monitoring of an activity diary, exercise self-efficacy, recovery heart rate); motivational phase (e.g., goal setting, time management, exercise game plan); and the mental skill development phase (e.g., mental preparation, attention focus, imagery, tension control and building exercise confidence).

Sinclair and Sinclair (1994) concluded that the effective mental management of one’s physical performance requires the ability to set realistic long- and short-term goals with clear daily practice objectives. Attention must be focused specifically on relevant cues, and when this attention control starts to drift, it must be refocussed. The appropriate level of
arousal for one's ideal performing state must be learned and regulated. In addition, one must develop thought control skills that provide support for a positive and enabling self image.

Therefore, rather than attempting to shape individuals' behavior by external means, programs designed to enhance maintenance of participation should be tailored to individuals' needs, helping them to recognize and implement strategies that prevent relapse (Lovato and Green 1990). Thus, with the literature considered, an adult health education program was developed by the researcher. This was a nine session program over a five week period and lasted for one and a half hours per session. The program focused on the self-regulation of exercise behavior and was based on Bandura's (1986) principles of self-efficacy, and incorporated concepts and intervention strategies from the literature in three areas - adult education, health education and exercise psychology. This adult health education program was intended to increase and maintain the participation in health related aerobic exercise (jogging, cycling, swimming, exercise-bicycle or stairmaster). However, the aerobic activity targeted primarily for the focus of this program was brisk walking. The design of this program is discussed in greater detail in Chapter 3.

**Teaching adult health education: A nurturing perspective**

In a traditional view of teaching, the teachers are the active ones in an authoritarian transmission of information while the learners are passively educated. In terms of health
education, this often means that the teachers are very much the powerful ones with the special knowledge, training, and experience that allow them to control and solve other people's lifestyle problems. This approach to teaching however, perpetuates a widely prevalent but erroneous view that teachers possess all the answers concerning particular health education subjects. This tends to create a communication vacuum in the classroom and make teachers less approachable. According to Hanna and McGill (1985), when learning is reduced to simply receiving a transmission of knowledge, it can foster a disregard for learning.

Conversely, a humanistic approach toward education underlies a nurturing perspective of teaching. This is drawn from the work of humanistic psychologists such as Maslow (1968) and has been adapted to adult education by Knowles (1984). A nurturing perspective strives to empower students and essentially views the learning process as a collaborative, cooperative, and hands-on interactive venture with negotiated objectives, methods, and evaluative criteria. A nurturing teacher holds firmly a core belief that the learner is important in his or her own right and is an equal partner working towards the improvement of a healthful behavior. Steuart (1993) suggested that from this perspective, the teacher views the learner as one who knows himself, his own needs and aspirations and has his own interpretations of health as a value, and of the value of health. Therefore, from this perspective of teaching, a much closer relationship tends to exist between the teacher and
the learner in comparison to traditional approaches. Noddings (1986) referred to the quality of this relationship as "fidelity", which is guided not by obligation, but from an ethic of caring for the development of the whole person which enhances the quality and depth of both teaching and learning. Central to this relationship between the teacher and learner is effective communication. This enables the giving and receiving of open and honest feedback in a way that creates minimal defensiveness and power differential. This approach is seen to unlock the potential and power within the learner and enhance self-directed learning.

Pratt (1992) examined the variation among five different conceptions of teaching and suggested that, rather than focusing on the absorption of content or higher forms of cognition, a nurturing perspective of teaching focuses on enhancing the self-concept and facilitating personal agency through a challenging, supportive and guiding environment. Aspy and Roebuck (1974) found that people who received high levels of empathy, congruence and positive regard were likely to attain more growth than those who were given low levels. Knox (1983) suggested that a nurturing teacher encourages participants to be resources for their own learning and for the learning of others.

It is important to note however, that some students may not prefer this teaching approach, especially those adults who were used to rigid formal education and have not had recent educational experiences. In this context, these people may be initially acutely apprehensive about the perceived openness,
active effort, and responsibility that is required for their own learning. Additionally, Brookfield (1990) pointed out three other potential problems with this perspective of teaching:

(1) a facilitator must always please the learner by meeting his or her needs in the manner that he or she requested.
(2) the learners are always the best judges of their own interests.
(3) teacher burn-out.

Clearly, when this perspective of teaching is practised to the extreme, it can be overly consumerist (Pratt 1992). Thus, a teacher must find a balance between caring and negotiating learning aims, with those that are challenging and go beyond the comfortable ways of thinking and acting in order to enhance growth. In addition, the teacher must know his or her own personal boundaries between teaching and counselling. This is particularly relevant when teaching adult health education so that excessive personal and emotional involvement in the learners' progression toward a lifestyle change can be prevented.

A nurturing perspective therefore, is not simply a soft passive approach to teaching adult health education. The teachers too, are challenged and develop a reflective practice seeking a balance between challenging content and student needs. Essentially, the teacher values the experiences of the students, listens, and bring his or her own experiences to the
relationship which is unique to a particular group. Finally, a nurturing teacher maintains his/her humanistic values and perspective to his/her work, remains open to new ideas, and avoids the negative habits of burn-out or apathy.

Summary

There is a research need to develop and investigate the impact of health education programs that are intended to increase the participation in and maintenance of regular exercise. Health education by it's very nature is interdisciplinary thus, it is necessary to draw upon the theoretical frameworks of several fields to address this research area.

Despite the lack of evidence regarding exercise adherence, the literature suggests that health education programs that are developed using Bandura's (1986) self-efficacy theory are effective in maintaining a variety of health behaviors. The exercise psychology literature also reports success in maintaining levels of exercise when interventions have focused on the self-regulation of exercise behavior. Contemporary health education approaches to the planning of programs tend to support and compliment these recommendations and add that the needs of the individual and the context in which he or she has to operate need to be taken into account. In addition, inherent in the ideology of a nurturing perspective of teaching is the idea that adults are capable of being active participants and are able to self-direct their own learning process. Therefore, drawing upon
the related literatures in exercise psychology, health education and adult education enhances the efficacy of health education programs that are intended to empower individuals towards the self-management of regular exercise.

For the purpose of this study, an adult health education program was developed that combined the literature on exercise psychology, health education and adult education. The purpose of this study was to investigate the impact of this program on exercise self-efficacy and participation in leisure-time physical activity.
CHAPTER 3
METHODOLOGY

Program design

Planning concepts were applied for the delivery of this intervention program in a community setting using Green and Kreuter's (1991) Precede framework. This was initially carried out via a pilot study survey by the researcher in February 1993 on the Acadia Park community. This survey assessed the needs of the clients and the environmental characteristics and revealed the following information about the female residents of Acadia Park: interest rate in attending a health education program at a local venue in the community that was intended to increase the participation in and adherence to leisure-time physical activity; the preferred time to attend a course or participate in exercise; motives for participating in regular exercise; perceived barriers that prevent the participation in regular exercise; general exercise self-efficacy scores; the use of self-regulatory strategies for exercise participation; frequency of participation in leisure-time physical activity; popular local walking routes; and local exercise opportunities. The second phase of the planning involved preparing an instructional plan based on the principles of a nurturing perspective to adult education. A needs assessment was carried out throughout the delivery of the course in the form of negotiating the course content and specific issues to be addressed. The final phase of the planning was concerned with coordinating administrative support from the staff at Acadia Park. Appendix D indicates the
aims and objectives of the intervention program that were based on the planning concepts of the Precede framework. Details of the program outline and the session contents for the intervention program can be found in Appendix E.

The sequence of this program was delivered using the guidelines suggested by Biddle and Mutrie (1991), Albinson and Bull (1988), and Boutcher and Rotella (1987). The program identifies the nature of the problem, begins with behavioral strategies (e.g., goal setting and self-monitoring) then progresses to cognitive strategies which complete the self-regulation of exercise behavior. A pre-requisite for the effective use of cognitive strategies is the ability to control tension levels (Albinson and Bull 1988). Thus, tension control preceded the imagery component. Imagery provides the foundation for both focusing skills and positive thinking strategies, therefore, this component was suitably scheduled prior to these other two components. The session related to positive thinking brings together Bandura's (1986) components for developing self-efficacy and therefore was appropriately situated at the end of the cognitive-behavioral skills sessions. The final session revisited relapse prevention strategies and allowed the individual a valuable opportunity to draw from personal experience and use any of the strategies from the course to address real-life barriers that could prevent the participation in regular exercise. The program was drawn to a close with the application and formulation of an exercise game-plan. The format for each session involved a short lecture (skill introduction, benefits
of the skill, effective and ineffective application, and how to improve skill application), discussion and practical.

For the purpose of this program, a detailed manual was developed by the researcher which included guidelines for teaching adult health education from a nurturing perspective. The manual contained examples of overheads, worksheets, questionnaires, self-monitoring tasks, learning objectives for each session, and a course evaluation form.

**Subject Population**

Thirty nine female residents from the Acadia Park community were recruited for this study. The subjects were aged between 23-51 years old and came from a variety of countries and ethnic backgrounds. These subjects varied in occupational and educational status, and ranged from single graduate students with no children, to married part-time employees with three children (see Table 1). These subjects had volunteered to attend an adult health education program that was offered in the community programs calendar. The subjects were recruited to attend the health education program via a pilot study survey on leisure-time physical activity and self-efficacy levels in the Acadia Park community. The course was also promoted through various meetings with minority groups within the community, the Acadia Park newsletter and a flyer to each home in the community (N=530).
Table 1  Demographic Data of the Subjects in the Experimental and Control Group

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th>EXPERIMENTAL</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=19</td>
<td>N=20</td>
</tr>
<tr>
<td><strong>AGE (mean, range)</strong></td>
<td>34 (24-51)</td>
<td>32.5 (23-46)</td>
</tr>
<tr>
<td><strong>SEX</strong></td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td><strong>MARITAL STATUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Single</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Div. / Sep. / Wid.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>NUMBER OF CHILDREN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Children</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>One Child</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Two or More</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td><strong>EDUCATION / OCCUPATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>16 (10-23)</td>
<td>15.4 (12-21)</td>
</tr>
<tr>
<td>Student</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Worker</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Homemaker</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td><strong>ETHNICITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian</td>
<td>11</td>
<td>12 **</td>
</tr>
<tr>
<td>Chinese</td>
<td>3 **</td>
<td>3 *</td>
</tr>
<tr>
<td>Iran/Iraq</td>
<td>2</td>
<td>3 *</td>
</tr>
<tr>
<td>E.European</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>British</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Israeli</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>MEAN ATTENDANCE</strong></td>
<td>73.8% (N=17)</td>
<td>64.6% (N=16)</td>
</tr>
</tbody>
</table>

* Subject Attrition.
Criteria for subject selection to this study were that the subject had been sedentary, defined as engaging in moderate or vigorous aerobic exercise (using Godin and Shephard's 1985, activity classifications) no more than twice per week during the previous six months, and that they were without any predisposing illness or injury. This information was obtained from the Stages of Exercise Behavior Change questionnaire. As the subjects registered for the health education program, they were matched and paired in groups of five using demographic data and then randomly assigned to either the experimental group (N=19), or a control group (N=20). The paired matching technique was an attempt to reduce the variability between the groups. This process was successful for placing approximately thirty four of the thirty nine original participants. The other five subjects had restricted time commitments and, therefore, self-selected a specific course because of scheduling (N=1 experimental group and N=4 control group). The experimental group received the cognitive-behavioral skills program (Appendix E) and the control group received a nine session program based on standard health information (Appendix F). Each program was taught using the principles of a nurturing perspective of teaching and interactive learning. The control program however, did not focus on self-regulatory strategies or the principles of topic-specific self-efficacy. Only subjects who had attended four or more sessions of each program were considered for the data collection.
**Subject Attrition**

Of the initial thirty nine subjects who registered for the health education programs, two did not show up for the first or remaining sessions and four women did not attend more than three sessions. This reduced the final sample size to thirty three subjects (N=17 for the experimental group, N=16 for the control group). Only initial data are available for the four women who did not attend more than three sessions. The mean exercise self-efficacy score for these subjects (15.25) and the mean exercise frequency score (1.0) was not significantly different from the means of the attending subjects. The reasons given by those who did not attend more than three sessions included: "language difficulties" (X2), "...too busy to make every class," and, "I do not have enough time ...and it's difficult to get a baby sitter."

**Procedures**

Subjects reported to the Acadia Park Fireside Lounge for a health education workshop twice weekly, for five weeks, and each workshop session lasted ninety minutes. Two different programs were taught during this study. Each program was delivered to approximately twenty subjects who had registered for a program. The programs were led (as outlined in Appendix E and F) and supervised by the same instructor, who was certified in workplace and community health education teaching. Each group completed the Exercise Behavior Questionnaire (Appendix B) prior to the commencement of their programs, on completion of the
programs, and at the end of a five-week follow-up period. The experimental design for this study can be seen in Figure 1.
### Experimental Design

<table>
<thead>
<tr>
<th>START OF PROGRAM</th>
<th>END OF PROGRAM</th>
<th>FIVE WEEK FOLLOW-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(5 weeks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5 weeks)</td>
</tr>
</tbody>
</table>

**GROUPS**

<table>
<thead>
<tr>
<th>Expt.</th>
<th>Ie</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Ic</td>
<td>*</td>
</tr>
</tbody>
</table>

**Ie** = Experimental Intervention  
**Ic** = Control Intervention

* **Testing of dependent variables**
  
  (a) Exercise Behavior (frequency per week)  
  (b) Exercise Self-Efficacy Scale

---

**Figure 1** Experimental Design
To encourage the participants from both groups to return the completed Exercise Behavior Questionnaire at the end of the five week follow-up, the returned coded numbers on the back of the questionnaire were entered into a lottery. This was held at the Acadia Park Office Block, five and a half weeks from the completion of the program. The draw was made by the administrative manager (Janice Robinson) and the winner was notified and given the $50.00 food voucher. On completion of the five week follow-up period, a random sample of fifty percent of the subjects (N=8) from the experimental group was chosen for in-depth telephone interviews to provide data regarding how learning was applied following the intervention program. The interviews were semi-structured in nature (guided by the three factors in the Proceed framework, see Appendix C) and lasted from 10-25 minutes. The researcher asked the participants to be as honest and forthright as possible since this information could help plan and improve future programs. The researcher made notes during the interview and afterwards thanked the respondents for their time and cooperation, and informed them of the winner of the $50.00 food voucher. This study took place between September 13th and November 19th, 1993.

**Instruments**

*7-Day Recall Exercise Behavior Questionnaire.*

There are various methods to assess levels of exercise behavior, from direct observation, which is objective but very expensive and impractical, to respondent recall questionnaires.
In a review of the questionnaires that measure leisure-time physical activity, Lamb and Brodie (1990) concluded that the selection of the most appropriate instrument is often based on a trade-off between practical, financial and quality considerations. For the purpose of this study exercise behavior was measured using the 7-Day Recall Exercise Behavior Questionnaire developed by Godin and Shephard (1985). This is a relatively simple questionnaire that presented a minimal burden to the respondent (Appendix B). It identifies a range of activities categorized by intensity where subjects indicated the number of times per week that they participated in any of the activities for longer than 15 minutes during the previous seven days. This provided a measure of total exercise participation in terms of type, frequency, intensity, and duration of exercise participation. The questionnaire was validated using measures of aerobic fitness and the reported test-retest reliability was 0.74 (N=58, P < 0.001). Research has shown that self-report questionnaires are a valid method to assess general patterns of exercise behavior, and to distinguish between those who exercise and those who do not (Blair et al. 1989, Gionet and Godin 1989).

**Exercise Self-Efficacy Scale.**

Exercise self-efficacy was measured using the Exercise Self-Efficacy Scale that was developed by Marcus et al. (1992). This questionnaire was developed along the guidelines suggested by Bandura (1977) and was composed of 5 items that reflected the respondent’s beliefs in his or her capability to continue
exercising successfully in the face of potential barriers (Appendix B). The items represented the most meaningful exercise self-efficacy factors that were found and validated by Sallis et al. (1988), namely resisting relapse and making time for exercise. A 7-point Likert scale was used to rate each of the five items, with 1 indicating "not at all confident" and 7 "very confident". Subjects could also endorse 0, "does not apply to me". This questionnaire was used in the study by Marcus et al. (1992) and the test-retest (product moment) reliability was reported to be 0.9 (N=20, P < 0.001)

**Stages of Exercise Behavior Change Scale.**

This scale was developed along the guidelines suggested by Prochaska and DiClemente (1985) and adapted for exercise participation by Marcus et al. (1992). This is a five-item questionnaire (stages of Precontemplation, Contemplation, Preparation, Action and Maintenance) where one rates each item on a 5-point Likert scale, with 1 indicating "strongly disagree" and 5 "strongly agree" (Appendix B). This scale has a Kappa index of reliability for the stages-of-change instrument over a two-week period of 0.78 (n=20). According to Fleiss (1981) a value of Kappa above 0.75 indicates strong agreement.
**Research Hypotheses**

H1. The experimental group will show higher levels of exercise self-efficacy and participation in exercise at the end of the five-week program than the control group.

H2. The experimental group will show higher levels of exercise self-efficacy and participation in exercise at the end of the five week follow-up period than the control group.

**Data Analysis**

The data were analyzed using a two-way analysis of variance, group (two) by time (three) factorial design with repeated measures on the second factor for each of the dependent variables (self-efficacy, and frequency of participation in exercise). Post-hoc analysis was conducted on significant effects. Schutz and Gessaroli (1993) suggested that when conducting multiple univariate analyses an adjustment should be made, based on the total number of significance tests to be performed, in order to control the type I error rate. The significance level was set initially at alpha = 0.05, and was thus adjusted to alpha = 0.025.

To provide a greater insight into how learning was applied following the intervention program, eight subjects were randomly chosen for in-depth telephone interviews. The interviews were guided by the three factors in the Proceed framework (Green and Kreuter 1991) that influence change: the predisposing factor identifies the learner's motives for attending the program and
describes the perceived changes in knowledge, beliefs, attitudes and values as a result of the program; the enabling factor describes the learner's skill level with respect to the motivation strategies as well as the opportunities and conditions in the individual's environment that facilitate or hinder participation in regular exercise; and the reinforcing factor identifies the sources of reward and support that can affect participation in regular exercise. This multidimensional framework takes into account the characteristics of the learner and the context in which the change is expected to occur. This evaluation was supplemented by information from the Stages of Exercise Behavior Change Scale (Appendix B).
CHAPTER 4

RESULTS

Introduction

Each dependent variable was analyzed separately. The dependent variable was initially analyzed for pre-program group differences and descriptive data were recorded regarding the group mean scores at pre-program, post-program and at the five week follow-up. These mean scores were then analyzed using a two-way analysis of variance, group (two) by time (three) factorial design with repeated measures on the second factor and appropriate post-hoc analyses. A Chi-square analysis was performed on the stages of exercise behavior change data. Finally, qualitative data were recorded that describes the educational experience from the intervention program.

7-Day Recall of Exercise Frequency

Data were collected for the subjects in both groups with respect to frequency per week of moderate exercise using the Godin and Shephard (1985) questionnaire. These data were recorded at pre-program, post-program and at the five week follow-up period. The mean exercise frequency levels at these data collection points are displayed in Table 2. These results were then analyzed using repeated measures analysis of variance. A summary of the ANOVA can be seen in Table 3.
<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE-TEST</th>
<th>POST-TEST</th>
<th>FOLLOW-UP</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>1.0</td>
<td>3.12</td>
<td>2.59</td>
<td>2.24</td>
</tr>
<tr>
<td>SD</td>
<td>(0.79)</td>
<td>(1.6)</td>
<td>(1.3)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.875</td>
<td>1.875</td>
<td>1.375</td>
<td>1.375</td>
</tr>
<tr>
<td>SD</td>
<td>(0.81)</td>
<td>(1.1)</td>
<td>(0.72)</td>
<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>0.937</td>
<td>2.49</td>
<td>1.98</td>
<td>1.81</td>
</tr>
</tbody>
</table>
Table 3 Summary of the Analysis of Variance Table Comparing Both Groups for Exercise Frequency

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>df</th>
<th>F</th>
<th>* p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>6.615</td>
<td>0.015</td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>47.11</td>
<td>0.001</td>
</tr>
<tr>
<td>Group X Time</td>
<td>2</td>
<td>7.574</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**TREND ANALYSIS**

**Linear**

| Time             | 1  | 36.996 | 0.001|
| Group X Time     | 1  | 10.047 | 0.003|

**Quadratic**

| Time            | 1  | 359.48 | 0.001|
| Group X Time    | 1  | 4.55   | 0.041|

* alpha = 0.025
Figure 2  Mean Exercise Frequency (Times Per Week) for Both Groups as a Function of Time
Pre-Program Group Differences

An independent t-test was performed to test for group differences in the pre-test mean scores for exercise frequency. The results indicated that the means (0.875 and 1.0 times per week) were not significantly different.

Two-way analysis of variance (Exercise Frequency)

Group Effect

Statistical analysis $F(1,31) = 6.615 \, p=0.015$ indicated that the mean values (2.24 and 1.375 times per week) of exercise frequency for the different groups (when averaged over time) were significantly different. The mean exercise frequency score for the experimental group was 63% higher than the mean exercise frequency score for the control group from pre-program to follow-up.

Time Effect

Statistical analysis $F(2,62) = 47.11 \, p<0.001$ indicated that the mean values for the three time periods (0.937, 2.49 and 1.98 times per week), when averaged over both groups, were significantly different from each other. Looking at the means for each time period, one can see a much greater increase from pre-program to post-program, than between post-program and follow-up. This may suggest that the increase was largely due to the influence of the programs. The decline from post-program to follow-up suggests that averaged over both groups no further increase in exercise
frequency occurred. A Tukey pairwise comparison test was carried out to see where the differences occurred in the main time effect while maintaining the experimental alpha level (0.025) at the pre-established level. The Tukey post-hoc analysis indicated that a significant difference occurred between pre-program and follow-up $Q(3,62) = 13.43$, $p<0.01$ and between pre-program and post-program $Q(3,62) = 9.02$ $p<0.01$. Therefore, when averaged over both groups the exercise frequency scores significantly increased from pre-program to post-program, however there was not a significant difference from post-program to follow-up where a decline occurred.

**Interaction Effect**

Statistical analysis $F(2,62) = 7.574$ $p<0.01$ indicated a significant interaction between group and time factors. The response patterns for each group across the time factors were different. Figure 2 illustrates a very small difference between the groups initially at pre-test (0.125 times per week), and then at the end of the five week program, the difference between the groups had increased ten-fold (1.25 times per week). The experimental group participated in exercise approximately 65% more frequently per week than the control group at the end of the five week program. The groups tended to converge slightly and showed a decrease in exercise frequency from the post-program to the follow-up period. The difference between the groups at the follow-up
period was nearly ten times greater than it was at pre-program levels. The mean exercise frequency for the experimental group was 85% higher than the control group at the follow-up. The Scheffe post-hoc comparison test was carried out on the interaction effect. The Scheffe analysis indicated that the mean differences between the experimental and the control group at the pre-program and post-program period (0.125 and 1.25) and also at the pre-program and follow-up (0.125 and 1.21) were significant $T_{obs}(1,62) = 3.424 \ p<0.01$ and $T_{obs}(1,62) = 3.332 \ p<0.01$ respectively.

Looking at the graph in Figure 2, one can see that although both groups tended to decrease from post-program to follow-up levels, the experimental group maintained a higher frequency of exercise than the control group which suggested that the intervention program was more effective in terms of exercise adherence.

Trend Analysis

Linear

When averaged over both groups the time factor showed a significant linear trend over the three time periods, thus both groups showed a positive improvement in exercise frequency. There was a linear trend interaction between the time and groups which suggests that the rate of increase (linear trend) for both groups was different. One can see from the graph in Figure 2 that the experimental group
improved in exercise frequency at a greater rate than the control group for the same time period. The linear trend accounted for 45% of the variance.

**Quadratic**

When averaged over both groups, there was a significant quadratic trend over the three time periods, thus the groups tended to level off in exercise frequency from post-program levels (i.e., they deviated from the linear trend). A non-significant quadratic trend interaction between the time and groups suggests that the levelling which occurred was the same for both groups. The quadratic trend accounted for approximately 55% of the variance.

**Exercise Self-Efficacy**

Data were collected for the subjects in both groups with respect to exercise self-efficacy. These data were recorded at pre-program, post-program and at the five week follow-up period. The mean exercise self-efficacy scores for these time periods are displayed in Table 4. These results were analyzed using repeated measures analysis of variance. A summary of the ANOVA can be seen in Table 5.

**Pre-Program Group Differences**

An independent t-test was performed to test for group differences in the pre-test mean scores for exercise self-
Table 4  The Mean Exercise Self-Efficacy Scores for Both Groups at Three Time Periods

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE-TEST</th>
<th>POST-TEST</th>
<th>FOLLOW-UP</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>16.06</td>
<td>25.06</td>
<td>25.83</td>
<td>22.32</td>
</tr>
<tr>
<td>SD</td>
<td>(3.8)</td>
<td>(4.6)</td>
<td>(7.08)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>15.19</td>
<td>19.94</td>
<td>18.75</td>
<td>17.96</td>
</tr>
<tr>
<td>SD</td>
<td>(6.8)</td>
<td>(5.6)</td>
<td>(3.9)</td>
<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>15.63</td>
<td>22.5</td>
<td>22.29</td>
<td>20.14</td>
</tr>
</tbody>
</table>
Figure 3 Mean Exercise Self-Efficacy Scores (Unit Measures) for Both Groups as a Function of Time
Table 5  Summary of the Analysis of Variance Table Comparing Both Groups for Exercise Self-Efficacy

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>df</th>
<th>F</th>
<th>* p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>7.665</td>
<td>0.009</td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>67.483</td>
<td>0.001</td>
</tr>
<tr>
<td>Group X Time</td>
<td>2</td>
<td>11.165</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**TREND ANALYSIS**

**Linear**

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>F</th>
<th>* p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>64.341</td>
<td>0.001</td>
</tr>
<tr>
<td>Group X Time</td>
<td>1</td>
<td>14.006</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**Quadratic**

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>F</th>
<th>* p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>1</td>
<td>77.623</td>
<td>0.001</td>
</tr>
<tr>
<td>Group X Time</td>
<td>1</td>
<td>1.997</td>
<td>0.168</td>
</tr>
</tbody>
</table>

* alpha = 0.025
efficacy. The results indicated that the mean exercise self-efficacy scores (15.19 and 16.06) were not significantly different. These mean scores were lower than those reported by Marcus et al. (1992) for 429 male and female government employees (M=29).

**Two-way analysis of variance (Exercise Self-Efficacy)**

**Group Effect**

Statistical analysis $F(1,31) = 7.665, p=0.009$ indicated that the mean exercise self-efficacy scores for the two groups when averaged over time (22.32 and 17.96 respectively) were significantly different. The mean self-efficacy score for the experimental group was 24% higher than the mean self-efficacy score for the control group.

**Time Effect**

Statistical analysis $F(2,62) = 67.483, p<0.001$ indicated that the mean exercise self-efficacy scores for the three time periods (pre-program = 15.63, post-program = 22.5 and follow-up = 22.29) when averaged over both groups were significantly different from each other. Looking at these means, one can see a greater increase from pre-program to post-program, than between post-program to follow-up. This may suggest that the increase was largely due to the influence of the programs. The decline from post-program to follow-up suggests that averaged over both groups no further
development of self-efficacy took place. A Tukey pairwise comparison test was carried out to see where the differences occurred in the main time effect while maintaining the experimental alpha level (0.025) at the pre-established level. The Tukey post-hoc analysis indicated that a significant difference occurred between pre-program and follow-up $Q(3,62) = 13.98, p<0.01$ and between pre-program and post-program $Q(3,62) = 14.42, p<0.01$. Therefore, when averaged over both groups, the exercise self-efficacy scores significantly increased from pre-program to post-program, however there was not a significant difference from post-program to follow-up where a levelling off occurred.

**Interaction Effect**

Statistical analysis $F(2,62) = 11.165$ $p<0.01$ indicated a significant interaction between group and time factors. The response patterns for each group across the time factors was different. From the graph in Figure 3, one sees a very small difference between the groups initially at pre-test (0.87), and then at the end of the five week program, the difference between the groups had increased five-fold (5.12). At the end of the follow-up period, the groups continued to diverge with the experimental group continuing to improve slightly. The control group reverts back to between pre-program and post-program levels. The difference between the groups at the follow-up period was over seven times greater than it was at pre-program levels. The Scheffe
post-hoc comparison test was carried out on the interaction effect. The Scheffe analysis indicated that the mean differences between the experimental and the control group at the pre-program and the post-program periods (0.87 and 5.12 respectively) and also at the pre-program and follow-up (0.87 and 7.08 respectively) were significant $T_{obs}(1,62) = 3.153 \ p<0.01$ and $T_{obs}(1,62) = 4.604 \ p<0.01$ respectively. The graph in Figure 3, shows that the experimental group continued to improve slightly on self-efficacy from post-program levels (approximately 3%) whereas the control group decreased in self-efficacy by approximately 6% between post-program and follow-up. Therefore in terms of exercise adherence, it would appear that the experimental program was more effective for increasing and maintaining exercise self-efficacy.

**Trend Analysis**

**Linear**

The time factor showed a significant linear trend (when averaged over both groups) over the three time periods where the groups showed a positive improvement in self-efficacy. The linear trend interaction between the time and groups suggests that the rate of increase (linear trend) for both groups was different. One can see from the graph in Figure 3 that the experimental group improved at a greater rate for
the same time period. The linear trend accounted for 73% of the variance.

**Quadratic**

When averaged over both groups, there was a significant quadratic trend over the three time periods. The groups tended to level off from the post-program levels (i.e., they deviated from the linear trend). A non-significant quadratic trend interaction between the time and groups suggests that the levelling which occurred was the same for both groups. The quadratic trend accounted for approximately 27% of the variance.

**Correlation Matrix**

The Pearson—product moment correlations quantify the relationship between the 7-day recall of exercise frequency and exercise self-efficacy. The high correlations found in this study (Table 6) between exercise frequency and exercise self-efficacy at each time period (0.7, 0.85, and 0.88 \(p<0.01\)) supported the findings by McAuley and Jacobson (1991) that self-efficacy appears to be a useful predictor of exercise participation.
Table 6  The Pearson Correlation Matrix for Exercise Frequency and Exercise Self-Efficacy as a Function of Time

<table>
<thead>
<tr>
<th></th>
<th>FREQ1</th>
<th>FREQ2</th>
<th>FREQ3</th>
<th>SE1</th>
<th>SE2</th>
<th>SE3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQ1</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREQ2</td>
<td>0.687</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREQ3</td>
<td>0.430</td>
<td>0.833</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE1</td>
<td>0.702</td>
<td>0.590</td>
<td>0.355</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE2</td>
<td>0.607</td>
<td>0.855</td>
<td>0.753</td>
<td>0.701</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>SE3</td>
<td>0.497</td>
<td>0.835</td>
<td>0.884</td>
<td>0.482</td>
<td>0.867</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* N = 33

FREQ1 = Pre-program exercise frequency.
FREQ2 = Post-program exercise frequency.
FREQ3 = Follow-up exercise frequency.
SE1  = Pre-program exercise self-efficacy.
SE2  = Post-program exercise self-efficacy.
SE3  = Follow-up exercise self-efficacy.
**Stages of Exercise Behavior Change**

The data in Table 7 indicate the percentage of subjects from each group at pre-program and post-program in the stages of exercise behavior change. A summary of the Chi-square analysis is shown in Table 8. The analysis of the pre-program group differences using Chi-square indicated that the calculated value (Chi-square = 0.226, when corrected for continuity) was less than the critical value (Chi-square = 3.841) and therefore the null hypothesis, that stated that there would be no differences in the pattern of the stages of exercise behavior change between the two groups at pre-program was supported. Thus the distribution of subjects in each group for the stages of exercise behavior change at pre-program was not significantly different (Chi-square violation: expected frequency for two cells was less than 10 for df=1). In addition, Table 7 verifies that prior to these programs the subjects in each group were not regular exercisers.

Chi-square analyses of the changes from pre- to post-program for the experimental group indicated that the calculated value (Chi-square = 9.728) was greater than the critical value (Chi-square = 5.991) and therefore the null hypothesis that stated that the pattern of the stages of exercise behavior change for the intervention group would not be significantly different from pre- to post-program was rejected. Thus the distribution of subjects in the intervention program from pre- to post-program for the
Table 7  The Percentage Stages of Exercise Behavior Change for Both Groups at Pre-Program and Post-Program Periods

<table>
<thead>
<tr>
<th></th>
<th>PRE-PROGRAM</th>
<th></th>
<th>POST-PROGRAM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>0</td>
<td>53</td>
<td>47</td>
<td>0</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>65</td>
<td>35</td>
<td>0</td>
</tr>
</tbody>
</table>

P1 = I currently do not exercise, and I do not intend to start exercising in the next 6 months (precontemplation).
C = I currently do not exercise, but I am thinking about starting to exercise in the next 6 months (contemplation).
P2 = I currently exercise some, but not regularly (preparation).
A = I currently exercise regularly, but I have only begun doing so within the last 6 months (action).
M = I currently exercise regularly, and have done so for longer than 6 months (maintenance).

R = I have exercised regularly in the past, but I am not doing so currently (relapse history).

* Regular exercise = Moderate leisure-time physical activity 3 or more times per week for 20 minutes or more each time.
Table 8  Summary of Chi-Square Analysis for the Stages of Exercise Behavior Change

<table>
<thead>
<tr>
<th>Condition</th>
<th>Chi-Square</th>
<th>* p</th>
</tr>
</thead>
<tbody>
<tr>
<td>E pre – C pre</td>
<td>0.221</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>E post – C post</td>
<td>3.903</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>E pre – E post</td>
<td>9.78</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>C pre – C post</td>
<td>2.649</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

* alpha = 0.05
stages of exercise behavior change was significantly different ($p<0.05$).

Chi-square analyses of the changes from pre- to post-program for the control group indicated that the calculated value (Chi-square = 2.649) was less than the critical value (Chi-square = 5.991) and therefore the null hypothesis that stated that, there would be no differences in the pattern of the stages of exercise behavior change for the control group between pre- and post-program was supported. Thus the distribution of subjects in the control program from pre- to post-program for the stages of exercise behavior change was not significantly different.

The analysis of the post-program group differences using Chi-square indicated that the calculated value (Chi-square = 3.903) was less than the critical value (Chi-square = 5.991) and therefore the null hypothesis that stated that there would be no differences in the pattern of the stages of exercise behavior change between the two groups at post-program was supported. Thus the distribution of subjects in each group for the stages of exercise behavior change at post-program were not significantly different (Chi-square violation: expected frequency for two cells was less than 5 for df=2).

These results suggested that by the end of the five week program, on the whole more people from the intervention group changed from contemplating exercise to participating
in exercise (at some degree of involvement) than the control group.

**Intervention Program Evaluation Data**

The Green and Kreuter (1991) Procede evaluation framework was used to describe the educational experiences of eight randomly chosen subjects from the intervention program (Appendix D). The following is a summary of the impact of the program on perceived changes in knowledge, beliefs and skills.

**Knowledge** Many of the women had suggested that they had gained useful declarative and procedural knowledge regarding the application of the range of self-regulatory strategies. Those strategies which the subjects had perceived the most gains in knowledge included: time management, goal setting and imagery. Changes in knowledge were verified by the researcher using several indicators: worksheet feedback, class question and answer period regarding session content, pre- and post session personal profiling, quantitative group self-efficacy scores, and program evaluation feedback.

**Beliefs** Each subject had commented that this program had to some extent increased their own belief that they could participate in regular exercise. Two subjects noted however, that despite the empowerment potential of these strategies, they perceived that the barriers which prevented them from
participating in regular exercise were largely beyond their control. These subjects viewed the locus of control to be external with other family members or significant others. Changes in beliefs were reflected in the quantitative group mean self-efficacy scores (Table 4) and the program evaluation data (Appendix D).

Skills There were varying levels of perceived ability to apply the self-regulatory strategies. Some of the subjects had indicated that they were still working with an exercise game plan, others felt that more practice and self-reflection were required, and some of the subjects were using only specific strategies, notably imagery and time management. Two subjects felt that they did not have enough time during the day for the perceived planning and preparation that was required to implement the range of strategies. Many subjects had commented that by planning to increase every-day walking and use imagery productively enabled the likelihood of regular exercise. The main barriers that these subjects had to overcome included: finding baby sitters, family demands, poor finances and a perceived lack of time. Many subjects had commented that the intrinsic reward from a perceived increase in coping ability and the self-monitoring of thoughts feelings and actions were more important to them than external forms of reinforcement (i.e., pulse monitoring, social reinforcement etc.).
Summary

The results of this study indicate that the mean exercise frequency and the mean exercise self-efficacy scores for both the experimental group and the control group increased from pre-program, to the five week follow-up period. The experimental group however, increased and maintained the levels of both dependent variables significantly higher than the control group for the duration of this study. The subjects varied in their perceptions of the educational experience as well as for their knowledge, beliefs, values, barriers and opportunities to participate in regular exercise. The descriptive statistics, quantitative analysis and qualitative evaluation data will be discussed in the following chapter.
CHAPTER 5

DISCUSSION

Acadia Park is the family housing community at The University of British Columbia. This is a small and unique Canadian community composed mainly of graduate students and their families. Despite the international diversity of these residents, Acadia Park is a relatively well-integrated and supportive community. This community is very transient between the end of an academic term and the start of the next, however, the stability of the community between term periods makes it an ideal sample from which to recruit volunteers for a study. Clearly, the drawback with using this community in a study is the difficulty of generalizing from the study’s findings to other communities.

The Acadia Park administrative manager (Janice Robinson) agreed to provide a free venue and fund resource materials that were required to implement both programs. The unique nature of these programs in the community, good administrative support and free enrollment contributed to the popularity of and attendance in these programs. The researcher is a resident of Acadia Park and was able to make regular contact with the participants and the facility staff. This was particularly useful to revitalize those participants from both groups who had missed a particular class by providing them with the course materials and encouragement to attend the next class. The mean attendance level for the experimental group was 73% which represents an
average attendance of 6.5 sessions out of the total of nine. In contrast, the mean attendance level for the members of the control group was 64% (5.7 sessions). The lower attendance rate by the control group may have been due to familiarity with the program material and perceived use of the standard health information. The lottery for the $50.00 food voucher appeared to be a very popular incentive for individuals to complete the Exercise Behavior Questionnaires at the end of the five week follow-up period based on verbal evidence and a one hundred percent return rate.
guidelines recommended by the American College of Sports Medicine (1990). The programs began in September 1993 which was one of the driest and sunniest months of the year. The mean exercise frequency level at the end of the program was 3.12 times per week, however, the follow-up measurements were taken in mid-November. This was well into the winter climate and dark evenings of Vancouver and therefore may have had some impact on exercise behavior. Despite this, the mean frequency levels of the intervention group had increased over two and a half times from pre-program to the follow-up period, and with 59% of the members of this group reporting that they exercise three or more times per week at the time of the follow-up questionnaire. In contrast, the mean exercise frequency for the control group had increased by one and a half times from pre-program to follow-up and only 12.5% of the members of this group reporting that they exercise three or more times per week at the time of the follow-up questionnaire. These results are supported by the data on the Stages of Exercise Behavior Change in Table 7. This table indicates that at the start of the program, no subjects indicated that they had participated in moderate exercise 3 or more times per week for 20 minutes or more each time regularly within the last 6 months. By the end of the program 42% of the experimental group in comparison to 13% of the control group, reported that they participate in regular exercise.
Figure 2 reflects that both groups decreased in exercise frequency from post-program to the five week follow-up period. The rate of decrease appeared to be slightly more pronounced for the experimental group than the control group during this period. The differences between the two groups in exercise frequency at post-program and follow-up however, were not significant which suggested that the groups tended to level off and decrease at a similar rate. The experimental group however, did not return to near base-line levels as occurred in the control group. The limited number of points during which the data were collected do not permit analysis of whether the exercise frequency levels had stabilized by the time of the five week follow-up. A post-hoc analysis on the significant group by time interaction indicated that the differences between the groups at pre-program and post-program were significant. The experimental group increased in exercise frequency more than the control program by the end of the program ($p<0.01$) therefore, the first hypothesis that, the experimental group will participate in a higher frequency of exercise at the end of the program than the control group is accepted. A post-hoc analysis on the significant group by time interaction indicated that both the differences between the groups at pre-program and follow-up (0.125 and 1.21) and the differences between the groups at follow-up (2.59 and 1.375) were also significantly different ($p<0.01$). The higher frequency of exercise reported by the experimental group at
the five week follow-up suggested that this program was more effective in maintaining a higher frequency of exercise therefore, the second hypothesis that, the experimental group will participate in a higher frequency of exercise than the control group at the end of the follow-up program is also accepted.

Lamb and Brodie (1990) remarked, however, that the findings from self-report questionnaires need to be interpreted with caution. First, these methods are very likely to suffer from social desirability bias to satisfy the experimenter and, therefore, overestimate actual levels of exercise participation. Second, the accuracy of a recall questionnaire can suffer if respondents have a poor memory or lack of motivation. Third, a learning effect can occur when using these questionnaires on multiple occasions. Finally, due to weekly fluctuations in exercise behavior, self-report questionnaires can lack the sensitivity to measure improvements accurately. This is, perhaps, illustrated by the high standard deviations in exercise frequency recorded throughout the three time periods on both groups. The researcher did attempt to administer the questionnaire to both groups with similar instructions and under similar environmental conditions. Therefore, it would be expected that the same issues would occur for the control group and therefore, this was taken into account.
Exercise Self-Efficacy

The mean levels of exercise self-efficacy, when averaged over the three time periods, were significantly greater for the experimental group than the control group \((p=0.009)\). This is not too surprising since the intervention program was developed by integrating Bandura’s (1986) principles of self-efficacy with a variety of self-regulatory strategies to overcome barriers that could prevent regular exercise.

The most striking difference between self-efficacy and exercise frequency is shown when comparing the post-program and the five week follow-up period. The experimental group exhibited a slight increase in exercise self-efficacy between the post-program and the follow-up period which suggests that these strategies may have a positive and lasting effect on exercise self-efficacy. However, a non-significant post-hoc Scheffe test on the group by time interaction effect indicated that the group’s exercise self-efficacy scores tended to level off at a similar rate from post-program to follow-up. It is also important to note that the limited number of time points at which the data were collected does not clarify whether or not the exercise self-efficacy levels had stabilized at the five week follow-up period. A post-hoc analysis of the interaction effect indicated that the differences between the groups at pre-program and post-program time periods \((0.87 \text{ and } 5.12 \text{ units})\) were significantly different \((p<0.001)\). One can see from
Figure 3 that the experimental group increased in exercise self-efficacy significantly more than the control group at the end of the five week program (p<0.01) therefore, the first hypothesis that, the experimental group will have a higher exercise self-efficacy score at the end of the program than the control group is accepted. A post-hoc analysis on the significant group by time interaction indicated that both the differences between the groups at pre-program and follow-up (0.87 and 7.08 units) and the differences between the groups at follow-up (25.83 and 18.75 units) were also significantly different (p<0.01). The higher levels of exercise self-efficacy for the experimental group at the follow-up suggested that this program was more effective in maintaining a higher level of exercise self-efficacy therefore, the second hypothesis that, the experimental group will have a higher exercise self-efficacy score than the control group at the end of the follow-up program is accepted.

Self-reported measurements of exercise self-efficacy need to be treated with the same caution as previously stated in relation to the exercise frequency questionnaires. In addition, Bandura (1977) argued that self-efficacy must be assessed in relation to very specific behavioral referents since each situation is different. Interestingly, many of the women in this study had commented that the self-regulatory strategies had been reinforced by their success in generalizing to other desired behaviors (exams, thesis
writing, assignments and to family life). Therefore, although Bandura suggested that self-efficacy is situationally specific, the self-regulatory strategies that contribute to self-efficacy to some extent may in fact be generalizable to other behaviors of interest. This may provide an interesting hypothesis for future studies.

In criticism of the exercise self-efficacy scales that have been developed in the literature (Garcia and King 1991, Sallis et al. 1988, Marcus et al. 1992) and of the instrument used in this study is a consistency to include as one of the barriers to exercise, "when on vacation." For those people who go on vacation once per year and for two weeks in duration, it would seem that this item would contribute very little as a barrier to regular exercise and therefore, as one item out of a total of five on the questionnaire may have added some error to the overall exercise self-efficacy scores reported in this study. Second, the exercise self-efficacy scale used in this study omitted the following barriers: "a lack of social support from significant others," "child care opportunities" and, "exercising, after a long relapse." The data from Table 7 (stages of exercise behavior change) and also from the Proceed evaluation implied that these barriers were in fact important factors that influenced participation in exercise for the subjects in this study.

Bouffard et al. (1991) suggested that self-efficacy is based on the interaction between the individual's estimation
of the demands and conditions of a particular task, adequate coping strategies they believe they possess, and especially their ability to apply these strategies in a specific exercise situation. This relies, however, on a perceptual, rather than a rational estimation of a person’s capability. For example, a person may perceive his/her ability to cope better than or worse than it actually is. Similarly, a person may perceive that he or she has a lack of time available to do regular exercise when in fact there may be more time available but the person may manage time inefficiently, or it may be a convenient excuse. Therefore, the lack of available sources to verify the reality of these perceptions presents a potential problem when measuring this construct.

**Stages of Exercise Behavior Change**

The data in Table 7 suggested that the subjects were in various stages of exercise behavior change at pre- and post-program. At pre-program the distribution of subjects from each group in the stages of exercise behavior change was the same. However, at the end of the five week program the data suggested that, on the whole, more members of the experimental group (24%) appeared to move from the "contemplation" stage (thinking about regular exercise) to the "preparation" or "action" stages of exercise participation than had the control group (9%). The results in this table corroborated the findings from Marcus et al.
(1992) who found that there was a significant relationship between self-efficacy and the stages of exercise behavior change. In addition, this table also illustrated that 69% of the total sample used in this study had previously participated in regular exercise but were not doing so at the start of these programs. This supported the view by Lovato and Green (1990), that volunteers for experimental studies in health education programs may be more likely to be relapse-prone than the general population. Thus the quantitative analysis suggested that although the control program was effective in terms of increasing and maintaining exercise frequency and exercise self-efficacy, this approach was less effective than the intervention program. Steuart (1993) noted however, that in order to attribute change to a specific program, more rigorous measurements of natural change trends, directions, and rates prior to the start of the program would inspire a greater confidence. Although a control group was used for the purpose of this study, financial and subject recruitment constraints restricted the use of multiple base-line measures.

Quantitative approaches to evaluating isolated behavioral variables as a result of a program however, neglect valuable information regarding the process of change and therefore do not reveal the degree to which these variables are part of a larger system of thoughts, feelings and behaviors.
The Educational Experience

Green and Kreuter's (1991) Proceed evaluation framework was applied to describe the post-educational experiences (Appendix C) of eight randomly chosen female participants from the experimental group. This is a useful framework for the study of post-educational change experiences because of its emphasis on process and its broad perspective on context. The Proceed framework makes the thought processes and circumstances explicit. It, therefore, offered a realistic and flexible framework to describe how the program intentions became transformed to the realization of behavioral outcomes. This evaluation reflected the varied experiences of those who attended the intervention program and their various attempts at applying self-regulatory strategies to increase leisure-time physical activity. The following paragraphs present a summary of the main points from the interviews (which are reported in Appendix D) that were captured in the three factors of the framework (predisposing, enabling and reinforcing). Initially, the participants were asked about their perceptions regarding the nature of the course.

The Intervention Program The program generally appeared to be "on target," "dead-on," "great," "interesting," "informative," "original," and "just what I wanted." The intervention program was perceived by many of the women to provide direction and motivational skills (especially goal setting, time management and imagery) to self-direct and
maintain regular exercise. Minor and Brown (1993) noted that health-related exercise programs often begin in settings prescribed and supervised by health professionals. Research suggested however that it is only through self-directed performance of regular, appropriate exercise that the exercise habit is developed, maintained, and lasting health benefits accrued (Goldfine et al. 1991). Participants described their previous experiences with motivation as "quite uncontrollable," and "went in fits and starts." The majority of the women suggested that they gained a sense of empowerment from these strategies. Two women however, felt that the strategies were "unrealistic" and "idealistic," given the context in which they had to operate. Some of the women were still "grappling" with the motivation strategies, others planned to use them at a later date, and three women were using only specific motivation strategies. Adaptation refers to the degree to which the "it" that has been applied in practice had deviated from the original idea. During the implementation process the participants interacted directly with their local environment and therefore did not apply the whole range of motivation strategies at the practice level in ways that strictly adhered to the intentions of the program. According to Marjone and Wildavsky (1979), faithful implementation is sometimes undesirable, impossible, and often unforeseeable since implementation depends on what people bring to "it," as well as what "it" contains. Implementation, therefore, necessitates mutual adaptation
between the concept and the context so that behaviors can be adapted to local situations and changing circumstances.

These strategies tended to re-affirm the approach to planning and preparation for some, while others found that they offered a new way of organizing their day or week and therefore increased the likelihood of participating in regular exercise. One subject reported that "the course had reinforced my beliefs and strategies for planning." She had modified her previous approach to planning by consciously including all of the motivation strategies at various times and amounts into her exercise game-plan. Interestingly, she appeared to be the most consistent at applying these strategies to enhance regular exercise. Some participants however, noted that the strategies appear very "selfish", "individualistic" and "self-serving" which could mean that families may suffer as a result of their use.

The timing of using these strategies also seemed to be an important aspect for some. One woman commented that, "with the dark nights and Christmas approaching it was important to get something going;" for another woman, these strategies were something that she intend to use in the new year, once Christmas was over. The majority of women commented that, "there wasn’t enough time for each session or the program as a whole." There were a variety of suggestions offered to improve this including: "increase the length of each session to two hours," or "continue the course beyond its completion date, i.e., once per week in
order to practice the skills and for its social value." Married women commented that the course attendance habit had been established, not only for them, but also for the "significant others" who took their share of family/household responsibilities.

Participants varied in their perceptions and preferences regarding the balance between the discussion and the practical components of the sessions. Some would have preferred more practical time while others seemed to gain more inspiration from the discussion with other women. In fact, it appeared that the program was valued as much for its social value and opportunity to be with other women (without the children) as for its learning potential. Bandura (1986) suggested that interaction is the primary basis for social learning. This was endorsed in this program by encouraging learners to learn by doing, providing positive role modelling, an opportunity to meet with fellow learners, and practice opportunities within the context of an adult health education program.

One woman commented on her initial skepticism for a male teaching a female health course, but she felt that, "as the nature of the course and its format began to unfold, that this was not an inhibitor in any way to the dynamics and progress of the course discussion." This woman implied that the presence of the male teacher in this situation did not appear to hinder the learning process though ideally it would have been perhaps more appropriate if the course had
been led by a female. The positive influence of the women "connecting" together was felt to be a major factor influencing the attendance and implementation of this program. Nurturing group cohesion is an important aspect of teaching and this could be further enhanced in future courses by providing a list of names and contacts, for those who are willing, so that an informal and learner-initiated exercise network can be formed.

The handout materials got a mixed reception from, "useful" to "just more information that didn't help me apply the skills," and "I didn't have time to read them." The "free" course issue raised some interesting responses. Due to financial reasons some would not have been able to attend if the cost for the program had been similar to that of the other Acadia Park community programs. Others said that, "the curiosity and no financial obligation was an incentive to check it out," and one learner explained that, "regrettably, I probably would not have attended if I'd have had to pay. But, having been to the course, It would have been worth paying for..........within my budget."

(1) Predisposing Factor The participants came to the course for a variety of reasons (weight control, fitness, motivation skills, to "escape from the house and family," and social contact with other women). Some women acknowledged that their motives also changed as the course progressed, where the social aspect (in addition to the content) became a strong incentive to attend the program.
The group cohesion played a major role in reinforcing these strategies, (in particular time management, goal setting and imagery skills) since some participants met regularly outside of the class for early morning walks. Acquired goal setting and time management strategies were considered to be very useful for initiating exercise and for many, imagery had increased the enjoyment of the exercise experience. All of the women suggested that they felt they had learned to construct an exercise game-plan using the range of motivation strategies. According to Fullan (1991a) educational change induces the transformation of subjective realities by learning new ways of thinking and doing, new skills, knowledge, attitude and beliefs. He warned however, that when change is interpreted in an oversimplified way and neglects these aspects it can lead to an erroneous perception of change (false clarity). Behavioral change may and does occur without prior knowledge and attitude change. Steuart (1993b) stated that frequently knowledge and attitude changes are a consequence rather than a cause of behavioral change. Bandura (1986) noted however, that behavioral intentions to attain certain levels of performance or engage in a specific course of action increase the likelihood that the goals will be realized. Thus, individuals may possess the appropriate skills and a strong sense that they can execute them well but still fail to perform because they feel no personal commitment to the behavior.
The majority of the respondents reported that the strategies presented in the course increased their sense of control over perceived motivation; for others, it helped only marginally. Lovato and Green (1990) concluded that, "adopting a healthful practice may show little immediate reinforcement other than the satisfaction of self-control. This may be sufficient for some to override the hassles because the values and beliefs from which the satisfaction is derived make the accomplishment of self-control intrinsically satisfying."

Those who did not feel greatly empowered by the strategies tended to view the locus of control with other members of their family, "significant others" or with other environmental factors. These people also tended to feel more negative about their own health status and ability to control it.

(2) Enabling Factor Each participant had commented that they had "learned a lot from the course," however there were varying degrees of perceived ability to apply these newly acquired skills. Some people felt that, there was not adequate opportunity in their day to be able to do the additional planning and preparation that was perceived necessary to use these strategies. One participant commented that "it wasn't simply a case of applying these skills or not, it takes time and practice to get used to applying them effectively." Many participants found that the "Walking Routes: Ideas Sheet" was a useful guide for new walking
opportunities. This sheet was constructed by the participants in the class and tended to act as a trigger for discussion and a source of motivation for some to try new walking routes. Brisk walking is an ideal form of self-directed exercise since it can be a useful form of transport and does not require any specialist equipment, clothing, venue, cost or supervision, which may act as barriers to habitual exercise. The social network that had been established from the class offered additional opportunities to participate in regular exercise and evaluate attempts at applying these strategies. For some of the participants, an exercise game-plan was a positive framework that enabled them to feel more confident that regular exercise would take place. For others, the circumstances in the local environment prevented such plans being formulated, or put into action. Married females felt that the men in the households did not have to take into account the same considerations as women (i.e., child care) when they wanted to do something (e.g., regular exercise). Some women however, viewed these strategies as a basis for useful negotiation with their partners to share workloads, intentions and coordinate timetable commitments.

The broader context in which the participants lived revealed various barriers that prevented regular exercise. Social support and a perceived lack of available time to adequately plan, think about and prepare to use the strategies appeared to be main factors. The exercise
preferences of these subjects substantiated the research by Stephens, Jacobs and White (1985), who found that people prefer (particularly among those who are initially unfit) moderate intensity activities (e.g., brisk walking) and those they can perform individually, as opposed to more vigorous activities or a fitness regime in a structured setting. Studies have shown that unsupervised exercise at relatively low levels (i.e., low to moderate intensity 60-77% maximum heart rate) such as brisk walking, when performed on a regular basis was sufficient to significantly increase the functional capacity in apparently healthy sedentary adults and was also associated with reduced cardiovascular morbidity and mortality (Shoenfeld et al. 1988; Rippe et al. 1988; Hardman 1989; Bouchard et al. 1990). The preferred times (or realistic times) for exercise participation appeared to vary between the participants from early morning, to just before bed-time. Others reported that rather than plan a specific exercise session they found it easier to increase existing daily activity by "doubling" the distance of regular walks during daily tasks.

(3) Reinforcing Factor The literature suggests that both intrinsic and extrinsic motivation are important determinants of exercise behavior. However, it is important to note that the exercise itself must be intrinsically rewarding as there is some evidence to suggest that reliance on external motivators may reduce intrinsic reward in the long term (Weinberg 1984).
The respondents reported that external reinforcement came from: social forces (the group, family and friends), diary pages, pulse-rate monitoring, the beauty of the walking environment, or visibly through body image. Interestingly, a lack of social support was reported by females living both with, and without families to be a main factor reducing the reinforcement of exercise. This supported the findings of Dishman (1982) who found that spouse and family support were very important predictors of exercise participation. There are however, points of caution regarding the heavy reliance on social support as a means of external reinforcement. For example, well intended intimidation may cause social friction and is unlikely to benefit a person’s value or the maintenance of the desired behavior in the long term.

In favor of intrinsic motivation, Green, Wilson and Lovato (1986) suggested that, "maintenance requires a person who is motivated by a well-integrated set of beliefs and values about the personal benefits and appropriateness of the desired behavior." During this program, internal rewards were endorsed by helping subjects to self-monitor their thoughts, feelings and actions and encouraging them to recognize their own successes and praise themselves through positive self-talk. Bandura (1990), suggested that providing considerable information regarding progress will increase self-efficacy, as well as act as an important source of social support. The evaluation revealed that these
participants received various sources of reinforcement for the newly acquired skills. For some, the intrinsic feelings of control, the sense of satisfaction, perceived fitness, and the perceived increase in coping ability as a result of applying these strategies were given as internal sources of reinforcement. The generalizability of these motivation strategies toward exams, thesis writing, relaxation and family life were mentioned by many of the women as additional reinforcement for their value and application. This supported the view by Green, Wilson and Lovato (1986) who implied that when individuals take a greater initiative to develop their system of rewards, behavior tends to generalize and the reinforcement values are internalized within each individual's own value structure.

Therefore the Proceed evaluation revealed relevant information regarding the impact of the intervention program that otherwise would not have been available from the quantitative analysis. The program itself was a set of processes rather than one component thus, this evaluation provided valuable feedback regarding the perceived contributions made by the individual components within the program. It appeared that the goal setting and time management strategies were valuable to the clients for initiating an exercise plan, and that the cognitive skills played an important role in the enjoyment of the exercise experience. Focusing was not mentioned specifically during the interviews, though it was inferred from the respondents
that dissociation strategies during imagery were the most commonly employed. These strategies were perceived by some to have multiple benefits in different contexts.

For those individuals who perceived the program as having little impact, an informal interview (guided by the three factors of this framework) prior to the start of the program would likely have benefited both the client and the program instructor. This would clarify the broad context in which the learner has to overcome barriers and implement these strategies. An alternative strategy would be to have the clients prepare and bring to class a detailed contextual scenario that they would be willing to share with others in the group. This would enable more meaningful learning to occur in terms of how these strategies may be used in specific and detailed circumstances. Ottoson (1993, p.31) noted however that, "adult education deserves neither all the credit nor all the blame for the level and quality of application following adult education programs since it is but one element of a larger context."

Although change occurs at the individual level, change is also required by significant others in the person's life (i.e., the family or peers) to provide the support and stimulation that enhances the change to occur in practice. According to Bandura (1986), perceived self-efficacy affects every phase of the change process in terms of one's intentions for change, how hard one tries after one decides to change, one's resilience following setbacks, and how well
one maintains the gains that he or she achieved. Thus change is clearly a long and dynamic process that is shaped by multiple factors. Steuart (1993a) concluded that an understanding of the determinants of change has an implicit concern for the obstacles to change (including the physiological, psychological and socio-environmental factors) which lie at the heart of the challenge to health education. Session one of the intervention program addressed (through lecture and discussion) the stages and process of change using appropriate terminology to describe Dishman’s (1990) Lifespan Interaction Model and Prochaska and DiClemente’s (1985) Transtheoretical Model.

Although Table 7 and the data from the Proceed evaluation suggested that the subjects were in different stages of exercise behavior change, being part of a positive group experience in itself, may help to move some subjects closer toward contemplating action. On the other hand, a healthful change may involve a temporary surrender of security, anxiety, and require difficult decisions and awakenings about particular lifestyle practices that some people may find very difficult to confront and therefore find easier to resist. In addition, Kemerer (1991) suggested that the key to application resides in the learner’s perception of how important, meaningful and relevant the new learning is to his or her ability to work effectively in the setting where the application must take place.
This study suggested that the subjects varied in their understanding of the self-regulatory strategies, their adaptation of these strategies, previous experience with exercise motivation, stages and rates of exercise adoption, personal resources and perceived power, social support, and perceived exercise self-efficacy. Thus the multiple meanings and realities of the learners illustrates that when teaching, one must find a balance between providing challenging content that retains the long term goals of the program while also meeting the needs of the learner. This was achieved in this program by a question and answer discussion session regarding the material from the previous session as well as providing direct opportunities during each session for the participants to discuss and apply the strategies to their own individual situations.

Conclusions

The findings from this study suggested that an adult health education program which was based on Bandura's (1986) principles of self-efficacy theory and focused on the self-regulation of exercise behavior showed considerable potential as an effective health education program to increase and maintain levels of leisure-time physical activity. The first research hypothesis that the experimental group will participate in a higher frequency of exercise and have higher levels of exercise self-efficacy at the end of the five week program than the control group was
accepted. The second research hypothesis that the experimental group will maintain a higher frequency of exercise and a higher level of exercise self-efficacy at the end of the five week follow-up period than the control group was also accepted. Therefore this study adds support to a growing body of literature that this approach to planning and implementing health education programs is effective for increasing and maintaining health behavior by uniquely investigating exercise adherence.

Further research to investigate the efficacy of these findings in other contexts (community and workplace), using larger sample sizes, and collecting data at multiple time intervals, over a longer duration would provide a better indication regarding the maintenance potential of the intervention program. Second, future research may wish to examine the extent to which the individual components of the program affect the outcome measures. Finally, measures of aerobic capacity would add greater support to the potential of this program for increasing and maintaining regular exercise.
CHAPTER 6

SUMMARY

Despite a greater public awareness of the physiological and psychological benefits of regular exercise, as little as 8-20% of the population are sufficiently active to attain these health benefits (Centers for Disease Control 1990). Compounding this problem, Dishman (1991) reported that the typical drop-out rate from exercise programs has remained at approximately fifty percent.

Bouchard et al. (1990) concluded that interventions focused on knowledge, attitudes, intentions, fitness screening and traditional techniques of health promotion and education while helpful in initiating exercise behavior, have only a weak influence on maintaining behavior. They continue by suggesting that to maintain regular exercise, individuals need to be taught the self-regulation of behavior, are to be prepared for relapses, and need to receive tangible reinforcement for the physical activity that is undertaken.

A variety of interventions focusing on self-regulation through specific cognitive and behavioral skills have contributed significantly to increasing and maintaining physical activity levels. Atkins, Kaplan, Timms, Reinsch, and Loftback (1984), however, found that the most effective form of intervention was a combination of cognitive and behavioral strategies. Forman (1985) concluded that
cognitive-behavioral strategies emphasize personal responsibility for developing and maintaining health promoting behaviors on a permanent basis. Relapse prevention training typifies self-regulation and is based on acquiring coping strategies in the form of cognitive-behavioral skills to deal with disruptions. This form of training has been shown to be effective in an exercise setting (Belisle et al. 1987).

Educational intervention programs need to consider not only the content, but also the way in which the intervention is delivered. Adults bring a variety of needs and experiences to education programs and therefore should be encouraged to be resources for their own learning (Knox 1983). Marcus, Selby, Niaura, and Rossi (1992) suggested that there are different stages of exercise involvement. Thus the amount of progress a person makes as a result of an adult health education program which is intended to enhance exercise adherence, may also depend upon the stage of exercise involvement they were in at the start of the program. Therefore, intervention programs should be sensitive to the different stages and needs of those individuals whose behavior is expected to change. Thus the learning process should be collaborative and interactive, and a balance sought between challenging content and student needs.

According to Lawrance and McLeroy (1986), self-efficacy is the principal connection between knowledge and action,
since it is based on knowing what to do, how and when to do it, and having the desire to do the behavior. Bandura’s (1986) self-efficacy construct has shown success in many health behavioral change programs such as smoking cessation (DiClemente et al. 1985), weight control (Bernier and Avard 1986), and exercise program participation (McAuley and Jacobson 1991). The generalizability of Bandura’s principles for developing self-efficacy to an adult health education program that is intended to increase the participation in and adherence to leisure-time physical activity, is as yet unclear.

For the purpose of this study, a cognitive-behavioral skills health education program was developed by combining Bandura’s (1986) theoretical model of self-efficacy with concepts and intervention strategies drawn from adult education, health education and exercise psychology. This program focused on the self-regulation of exercise behavior and was intended to increase exercise self-efficacy and thus enhance the participation, enjoyment, reinforcement and adherence to regular exercise. The first stage of this study investigated whether an adult health education program which was intended to develop exercise self-efficacy would have a similar effect on the maintenance of exercise participation as that shown from similar programs on the maintenance of other health behaviors such as condom-use (Jemmott and Jemmott 1992); drug refusal (Jones et al. 1990); AIDS preventative behavior (Kasen 1992 and Magura et al. 1991);
adult health (Leviton 1989); heart disease prevention (Rose 1992); and adolescent health (Sprunger and Pellaux 1989). Second, this study investigated the impact of the intervention program on exercise self-efficacy and the participation in and maintenance of leisure-time physical activity. Finally, an evaluation was conducted using the three factors (predisposing, enabling and reinforcing) of Green and Kreuter’s (1991) Proceed framework (Appendix C) to describe how learning was applied following the intervention program.

The results of this study indicated that the experimental group participated in a higher frequency of exercise and had higher levels of exercise self-efficacy at the end of the program and at the end of the five week follow-up period than the control group. With consideration for the relatively short duration of this research project, these results suggested that health education programs that focus on the self-regulation of exercise behavior and which are intended to develop exercise self-efficacy are effective for increasing and maintaining leisure-time physical activity.

**Limitations of this Study**

(1) The subjective self-reported scoring of the dependent variables on the Exercise Behavior Questionnaire are not independently confirmed, hence this may cause bias.
(2) The seven day recall Exercise Frequency Questionnaire focused on leisure-time physical activity and omitted domestic physical activity.

(3) The relatively low test-retest reliability of the 7-Day Recall Exercise Frequency Questionnaire (0.74, P<0.001), suggests that the re-test only explains approximately fifty percent of the variance.

(4) Due to the self-selection bias of subjects who volunteer for health education programs, these subjects are not likely to represent a true sample of the population.

**Delimitations of this Study**

(1) The class size for each program was set to 15-20 clients. This was an attempt to enhance adult learning in a health education context and to obtain a sufficient sample size to optimize the power for this study. Bull (1991) however, suggested that working with people on an individual basis is likely to be more effective and successful when working with psychological skills training.

(2) The health education program was designed specifically for the following health related unsupervised aerobic exercise activities: brisk-walking, jogging, cycling,
swimming, exercise bicycle and stairmaster.  

(3) Due to the lack of available equipment, no laboratory measures of physiological fitness were carried out with these subjects throughout this study.  

(4) The findings of this study are not generalizable to women in other communities, nor are they generalizable to men in Acadia Park or any other community.  

(5) Due to financial constraints and the lack of qualified personnel to deliver these programs, the instructor and the researcher were the same person which may have caused bias toward the experimental group.  

**Additional Benefits From Research in This Field**  
Research can offer much assistance in planning and implementing programs, especially in providing a meaningful interdisciplinary analysis that has direct implications for practice (Vertinsky 1989). In terms of providing quality and effective adult health education programs which enhance the participation in and maintenance of habitual physical activity on a national scale, programs are required which are based on research in this interdisciplinary field of health promotion, adult education and exercise science. In addition, these programs need to be delivered by trained and competent health promotion professionals in these areas.
Thus, additional benefits from research in this field include:

1) The improvement of health professional training.
2) The improvement of school-based and adult health education programs.
3) The promotion and generalization of self-regulatory strategies to other areas of achievement (academic, career, health, lifestyle, and sport etc.).
REFERENCES


Ottoson, J.M. (1993). Test of a conceptual framework to analyze the application of learning following an adult education program. Unpublished manuscript.


APPENDIX A

Ethics Approval Certificate
Certificate of Approval

<table>
<thead>
<tr>
<th>PRINCIPAL INVESTIGATOR</th>
<th>DEPARTMENT</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleuler, S.</td>
<td>Phys Ed &amp; Recreation</td>
<td>B93-0229</td>
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</table>

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT

UBC Campus

CO-INVESTIGATORS:

Hubball, H., Phys Ed & Recreation

SPONSORING AGENCIES

TITLE:

The effects of a cognitive-behavioural skills education program on self-efficacy and participation in leisure-time physical activity

APPROVAL DATE

APR 22 1993

TERM (YEARS) 3 AMENDED:

CERTIFICATION:

The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.

Dr. R. Corteen or Dr. I. Franks, Associate Chairs

Dr. R. D. Spratley, Director, Research Services

This Certificate of Approval is valid for three years provided there is no change in the experimental procedures.
APPENDIX B

Exercise Behavior Questionnaire
EXERCISE BEHAVIOR QUESTIONNAIRE

AGE...........MARITAL STATUS.............

SEX.........NO. OF CHILDREN.............

NO. OF YEARS IN POST SECONDARY EDUCATION.............

OCCUPATION.................

(1) Please respond to the following questions by placing the appropriate number in the boxes which describes your feelings about physical activity.

(1) Strongly Disagree
(2) Disagree
(3) Uncertain
(4) Agree
(5) Strongly Agree

(a) I currently do not exercise, and I do not intend to start exercising in the next 6 months. ......

(b) I currently do not exercise, but I am thinking about starting to exercise in the next 6 months. ......

(c) I currently exercise some, but not regularly. ......

(d) I currently exercise regularly, but I have only begun doing so within the last 6 months. ......

(e) I currently exercise regularly, and have done so for longer than 6 months. ......

(f) I have exercised regularly in the past, but I am not doing so currently. ......

* Regular exercise = 3 or more times per week for 20 minutes or more each time.
2) Considering the last 7-Day period, how many times have you participated in the following kinds of activities for more than 15 minutes during your leisure-time.

a) Please circle the activity(s).

b) Indicate the frequency of participation in the last 7-days.

c) Indicate the total number of minutes that you have participated.

<table>
<thead>
<tr>
<th>Times per week</th>
<th>Total Number of minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strenuous Exercise</strong> (heart beats rapidly)</td>
<td></td>
</tr>
<tr>
<td>i.e.</td>
<td>running</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Moderate Exercise</strong> (not exhausting)</td>
<td></td>
</tr>
<tr>
<td>i.e.,</td>
<td>brisk walking</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mild Exercise</strong> (minimal effort)</td>
<td></td>
</tr>
<tr>
<td>i.e.,</td>
<td>yoga</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(3) Using the following scale as a yardstick, please answer the questions below.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not apply to me</td>
<td>Not at all</td>
<td>Moderately confident</td>
<td>Very confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I am confident I can participate in regular exercise when:

a. I am tired.  
   ......  
b. I am in a bad mood.  
   ......  
c. I feel I don't have time.  
   ......  
d. I am on vacation.  
   ......  
e. It is bad weather.  
   ......  

* Regular exercise = 3 or more times per week for 20 minutes or more each time.
APPENDIX C

Program Evaluation Questionnaire
INTERVIEW QUESTIONNAIRE

This questionnaire was used as a guideline during the interviews to obtain information regarding the three factors of the framework.

The Education Program

What did you think of the course outline, methods, format, practice time and the clarity of how to apply these strategies?

What use(s) do you think these strategies serve?

What is your own experience with exercise motivation?

Have you found any other benefits as a result of using these strategies?

(1) Predisposing Factor

What were your motives for attending the course?

What sort of things did you learn from the course?

What did you think of the individual motivation strategies?

How did you apply these strategies?

Did the course alter your beliefs regarding your ability to participate in regular exercise - How?

(2) Enabling Factor

Do you feel that you have sufficient knowledge to be able to apply these skills?

What sort of opportunities do you have to be able to apply these skills?

What barriers do you have to overcome in order to be able to apply these strategies?

How do you overcome these barriers?

(3) Reinforcing Factor

How do you think that your newly acquired skills have been reinforced?
APPENDIX D

Program Evaluation Data
**Education Factor** "The course was very interesting and dead-on target. I enjoyed being with other women and discussing our various barriers and solutions to regular exercise...I can't say that the content of the course actually solved my problems and feelings toward exercise but it certainly provided a lot of food for thought. I welcomed the opportunity to get out of the house and do something for myself instead of always feeling like I'm doing for others. The fact that no fee was charged was an added bonus."

**Predisposing Factor** "Motivation is definitely not one of my strengths. However, I always seem to be on the go and very busy helping my children and getting stuff for the house...I came to the course because I have gradually put on a lot of weight. I wanted to find a way of increasing my regular exercise as a means of weight control rather than a fitness class which isn’t what I want. I learned from each session of the course that I was able to attend (60% of classes), although a lot of it did seem like common sense really. The time management was very useful which I have tried on and off for organizing my day which has helped...Setting my own goals would mean that I wouldn’t get the other things done. I just don’t seem to have the scope to add exercise into my working day...I also felt that the positive thinking session was very useful and made me think that I should be more positive toward myself and praise myself once in a while. The other sessions seemed a little idealistic though and too self-centered...I think that the course has only marginally shifted my beliefs toward being able to participate in regular exercise... though when my husband returns from his three-month field research trip, I think these strategies will help me to get going."

**Enabling Factor** "All the family are very demanding and not really concerned with what mom does! In theory I do have the opportunity to exercise in the daytime, although after I have helped the others get ready in the morning and then the time it takes to get the house straight I don’t have the time for exercise. The kids are back at about 3pm too and so I have to get everything ready for the evening and hear how they are getting on at their new school...I feel constantly needed by all the family. The kids are going through difficult periods of adolescence and can be very worrying at times. We don’t have much money. I'm getting increasingly anxious about my weight gain and stress levels. My husband has gone away for three months on field research into the interior. This has increased my workload and stress levels. When my husband returns just before Christmas and shares the load, this will be the trigger to use these strategies and get some more exercise...I use the car mostly to get the shopping since the local store is too expensive. It would take up too much time to walk as well as the difficulty of carrying everything."
Reinforcing Factor "The time management strategies have been useful when I have used them on busy days. Also each Sunday I have got into the routine of driving to the beach by myself and having a stroll along the front. This has been very enjoyable and a good way to relax using the imagery and deep breathing. However, it doesn’t always go to plan – courtesy of my role as mother."

N(2), 34 years old, 2 children (5yrs & 8yrs), homemaker

Education Factor "The course was very interesting and well organized...I found the ‘before-during- and after approach to motivation strategies for regular exercise very useful when I tried these in practice. I felt that I learned a lot of useful things. I appreciated your efforts to make the course and venue feel like our club - and all for free too. I did enjoy the socializing with other women who were in a similar position to me...It was a refreshing change from the usual focus around the kids...Previously, I’d never really thought of approaching exercise this way but I have found the strategies to be very useful, especially goal setting and time management. The imagery certainly makes me enjoy a brisk walk more, though I think it makes my speed somewhat irregular, it also makes me more aware of what I am thinking about."

Predisposing Factor "I am usually willing but I often feel that I lack the motivation to do things, other than my busy role as mom. These strategies helped me have an exercise game-plan and get back on track...I came to the course looking for a way to increase motivation for regular exercise so that I could lose some weight without having to go to an aerobics class. I did not know that there was so much to know about goal setting and time management. Now I feel that I have a realistic exercise game-plan that I have fitted to the best time of my day - 6:30 a.m...the imagery and positive thinking were just what I needed to start positive actions. This helped me feel that I can manage my day and fit in a brisk walk regularly...I often go with the friends that I had met at the course and we go down to the beach in the early morning. I am not sure how long this will continue as everyone is quite busy now toward the end of term, but either way, the early mornings suit me very well and make me feel so much better at dealing with the morning activity in the house, as everyone wants breakfast and prepares for school."

Enabling Factor "My husband is very supportive of my efforts to get up early and exercise. It does not put him out as he and the children are still in bed when I get back...I find that the group of early morning brisk walkers are a terrific source of motivation for me. I really do look forward to it and often use a range of imagery types to suit my mood, especially when it has been difficult to get out of bed!...The day is very busy with a five year old, and an eight year old to prepare for school as
well as the household chores. Sometimes I do manage a walk in the daytime if I have not managed to go early morning. My neighbor has two young children at home and we occasionally cover for each other, especially when I have to walk to the shops. My son is five years old and is too big for the buggy and its too far for him to walk, so I go on my own which is quite a treat after being with children all day."

**Reinforcing Factor** "The very act of achieving getting up so early, having done something useful for myself and then being prepared for the family as they wake up and need clothes and food and encouragement, is very rewarding and has made me feel so much better for it. I have a small diary where I have started to jot down my thoughts and actions. Maybe my daughter will enjoy reading it one day. This takes up more time but I do not make large entries. At the end of the week when I look back it serves as a reminder of what I have or have not done that week. This helps me to feel better as long as I can keep it up! I have also felt a little more fitter. It is something that I have been meaning to do for a long time and this course as acted as a starting block for me - I hope I can keep it up so that after Christmas I do not have too much weight to lose."

**N(3), 24 years old, single, graduate student**

**Education Factor** "Motivation is a crucial variable that is inconsistent in my own behavior. I tend to go up and down with it, I'd heard about strategies informally but did not know how to operate them effectively like the way that was taught on the course...The course was much better than I'd anticipated. I was surprised to learn so much when I'd half expected it to be very basic. I feel as though I could apply the strategies with a little revision from the handouts you provided. I do not think that the exercise practical was long enough to appreciate how these strategies could be used, but I guess there wasn't enough time really. You could always cut back on the discussion time, that didn't help me too much."

**Predisposing Factor** "I felt very committed to want to learn more about motivation strategies so that I could do better with my graduate studies and to tackle my weight gain which are important and feel like they are slipping away from me. I found that goal setting and time management strategies generalized well to both exercise and my studies...Even though I did not find the focusing or the imagery particularly useful, I believe that they can be beneficial at a later stage maybe...The course had been a shot in the arm for me to address my concerns and increased my belief that I could exercise a greater control of my own motivation and therefore performance. At least now I have a better idea how to structure and control my own motivation better. However I do not always get the time to put so much effort into the planning and preparation for it."
**Enabling Factor** "I share a comfortable apartment in Acadia Park only a few hundred meters from the forest, exercise room and university fields...I can fit exercise into my schedule at various times of the day though I prefer evenings after I have finished my classes and before I settle down for the night...I prefer to exercise with someone. I have enrolled in the aerobics class but you do not necessarily meet people there and I don’t always feel like going. I cycle to a from my classes...I feel reasonably equipped with these strategies now to help increase and maintain regular exercise. I have not applied these strategies exactly as the final game-plan that we’d looked at in class, but I have found the parts that I have already mentioned useful to me at this stage...Other than my studies, I do have time available and there are numerous opportunities to participate in regular exercise at Acadia Park."

**Reinforcing Factor** "I found that monitoring my pulse was a good form of reinforcement sometimes. I feel okay once I get going but I don’t have any family here or close friends here at the present to get encouragement from or share my exercise intentions or achievements with. My diary does help as a source of reinforcement when I see exercise entries - it also makes me feel a little guilty when it is blank too!"

**N(4), 36 years old, 2 children (9yrs & 7yrs), homemaker (previous university degree)**

**Education Factor** "I enjoyed the course, it is a pity that it could not have been longer since everyone enjoyed coming each week. I was disappointed that I had to miss a few sessions but I appreciated your efforts to contact me and keep me informed so that I didn’t feel at a loss when I came the next time...The group walking network was a good idea and I really found it useful to try the ‘walking routes’ that we’d compiled together."

**Predisposing Factor** "I think a healthy lifestyle is essential to get the most out of life and I was attracted to the course hoping to learn more and improve on my own knowledge. I came to the first session really to decide whether or not it was worth coming to the other sessions - especially as it was free...I found that your approach to health was quite original and I learned a lot from these skills to get a solid base for motivation...I am a good planner. I think this was developed from my days as a school teacher. It is quite familiar to me to juggle everything in my life and find time to do things that are important to me, like regular exercise...I have never really approached motivation in such a systematic way and I found that this improved my existing approach. I like having a sense of control over things and these strategies really enable that."

**Enabling Factor** "My children are very demanding and active. They are also quite independent which does release me to be able to
go for walks or the occasional jog regularly... I have an exercise game-plan which is flexible and once I have prearranged a time for it during the day I decide what imagery I am going to use as I go along based on something that is enjoyable to think about... All my family encourage my fitness. I think they think that it is good for mom to be doing something... I do not always fetch the children from school in the car if it is a nice day. That way we all get to walk and talk about the day together even though the kids prefer a ride after school!... I have to plan all my daily activities around the school day. Sometimes if one of the kids are sick then it throws the routine off course but other than this I have a fairly flexible but well established routine that gets what I want to get done, done!.

Reinforcing Factor "I get a lot of reinforcement from the intrinsic satisfaction and visibly knowing that I am in good shape. I guess this is also reinforced by my friends. I feel that I am quite fit and am coping with life reasonably well... My exercise has become less of a challenge and become more enjoyable with its focus on imagery to drift off to nice thoughts. I am sure that this helps to reinforce my desire to do regular exercise as well as for its benefits."

N(5), 39 years old, 2 children (6yrs & 9yrs), graduate student

Education Factor "The course was great, very professional and well managed. The content was just what I wanted to help me be more active... I would have liked more practical and less discussion. However, I did think that the people on the course contributed to it's success and it was useful drawing from everyone's experience... It was great fun going on some of the early morning walk trips to the beach with some of the women too, when I could make it... I initially thought that it may be odd for a man to lead a women's course. I think that you proved that this seemed a non-issue and addressed it with humor... The course needs to be two hours really."

Predisposing Factor "I felt that I needed to improve my motivation skills because my workloads were beginning to get on top of me. I didn't seem to be achieving very much with my health, or from my graduate studies... I liked the idea of an exercise game-plan with all the different components and their generalizability to my studies as well as to health. I thought that the skills would be obvious but I did learn a lot and can use them more effectively under conscious control to achieve my goals. I was definitely inspired to believe that I could fit exercise into my weekly routine and structure my studies more productively... The positive thinking, imagery, goal setting and time management have been a great help to keep me on track... I think that motivation is the key point to regular exercise regardless of facility access or other external supports. I always used to feel subject to the ups and downs of
motivation...The range of motivation strategies from the course seemed to apply well to a variety of situations and gave me a greater sense of control to deal with different circumstances and moods. I have not got a strict exercise game-plan as I don’t seem to have the time to prepare myself with all the strategies, but I do feel able to draw from them. I guess you get out only what you put in."

**Enabling Factor** "I have occasionally walked with the early morning group. This has given me an opportunity to exercise regularly although this isn’t my best time...With the kids in school, I find that lunchtimes are better for me...I have started using the free student sessions at the pool too. I thought it was a great idea to construct the route-options and exercise choices list...Sometimes the irregularity of graduate course loads have screwed up my routine. An assignment can take priority over my exercise if it is due in. Fortunately, it is not always like this so that I can manage to squeeze exercise into an otherwise relatively stable routine. I find that unless I am on top of things totally though, my exercise routine becomes vulnerable."

**Reinforcing Factor** "My husband and children have been a valuable source of encouragement to keep me going, at other times they seem to forget that I have needs too! The class group has also been a source of reinforcement. I find that the regularity of exercise is reinforcing in itself...I do take my pulse after a swim and again during the recovery period which gives me an indication of my fitness. This is a very useful way that I find to connect my mind and body."

**N(6), 33 years old, 1 child (2yrs) , graduate student**

**Education Factor** "I was very attracted by the course promotion aimed at improving motivation rather than an aerobics class which isn’t right for me...After the pressure of graduate courses, this program was very enjoyable and set at a comfortable pace where I could learn for learnings sake. It was so pleasant to be with other women and not be dictated to by children. Everyone seemed involved in the discussion...The venue was ideal and I appreciated that you had made the effort with the room to look like our club room...I find it very difficult to get motivated though I do seem to be busy with all of my responsibilities. The course helped me to give more structure to my schedule and organize my time a little better. However it is easy to slip back to my old ways - but at least I now know how to control it a little better. It also provides a great alternative to joining an exercise class."

**Predisposing Factor** "My motives for attending the course were concerns about my health and wanting an alternative to the aerobics class. I did learn something at each class especially
the time management. This helps me to try and control my weekly schedule more and find gaps that I could do other things including regular exercise...I take my child in the push chair to the village as part of my walk and I find that the imagery really helps me to think positively and think about the rest of the day...I do believe that I can now exercise regular but I need to keep at it which I do not always manage to do."

**Enabling Factor** "I do not have much opportunity to go off and do exercise on my own...My husband doesn’t think his role is looking after the child, so I try to get around this by taking the baby with me on my walks and extend the walks by coming home the long way...During class or library time we have to pay for a baby sitter which is very expensive. Therefore this means that I have to return home straight after classes...If I want to go for a walk I have to take my baby with me in the push-chair which limits where I can go...My husband does not have to make the same considerations as I do when he wants to do something."

**Reinforcing Factor** "The new skills have increased my motivation and enjoyment of walking. This is rewarding in itself and does increase my desire to take the child out in the push-chair for a walk. I have found that the imagery during my walks are a great way to plan for tomorrow."

**N(7), 51 years old, single 1 child (16yrs), graduate student**

**Education Factor** "An excellent course and very professional and sensitively facilitated. The content of the course was attractive and not like other health classes...Initially, I would have preferred more skills application but then I don’t know how this would have fitted into the time restriction...As the course progressed I found that the social aspect of the course extremely pleasant and always interesting...A free course was quite an incentive to give it a try. I wasn’t ready for the course to finish. I think we could have continued it at least once per week just as a get together and an opportunity to practice the skills...The handouts weren’t very useful as it was just more information."

**Predisposing Factor** "I came to the course because it was free and seemed related to self-improvement...I tended to participate in regular exercise intermittently and felt that this course may help me to improve on that and therefore make me a little more healthy...I learned some very useful strategies. I now ‘double’ my usual walks to the store or around campus and I also found that Imagery was the most useful skill. I have really got into it! I didn’t realize how often I used to daydream but now I do it consciously and with more emphasis on pleasurable thoughts and planning.I used to blow hot and cold with motivation. Therefore I enjoyed this approach that was flexible but also able to deal with a variety of situations...It doesn’t require
too much extra effort once you have an idea of the principles. I like the independence of controlling motivation rather than it controlling me. I still go hot and cold on motivation but I have a much better grip on controlling it now...The transfer of these strategies to studies and helping my son with some of his problems has helped greatly."

**Enabling Factor** "I have opportunities to participate in regular exercise though my son is going through a tough time right now and I feel that I need to be there for him rather than going off on my own pursuits. To balance this I do tend to increase existing daily activity by walking the long way, to and from places...With no other adult in the house to share life’s responsibilities, it is not so easy to get as much free time as I would like...The regular contact with the women from the group has given me another social outlet which helps me to participate in exercise in the mornings, when I can...I feel that I have a grasp of the strategies to use them by myself though I do not use them all in a conscious way."

**Reinforcing Factor** "I feel that I was socialized in an era when women didn’t get used to self-reinforcement and therefore I tend to suffer from this...Positive thinking skills has helped me but I am very poor at this and should make an effort to do it more regular. Being a single parent, I miss having an other partner to encourage my efforts as it is such a natural thing to focus on my son’s needs and give him as much support as he needs right now."

N(8), 41 years old, 3 children (14yrs, 9yrs & 7yrs) , part-time secretary

**Education Factor** "I went to the course initially because I was attracted by the emphasis on motivation strategies and because it was free. I didn’t expect it to be so well put together and managed...I enjoyed the discussion most of all...This gave things more meaning...I wasn’t too clear how to make use of the material - I didn’t get time to read the handouts...I also enjoyed the chance to get out of the house and be in nice company."

**Predisposing Factor** "I value my health but it is not something that I get hung up about...I came to the course to see if it would help me lose weight and pick up some tips that I could use to get fit...I was familiar with some of these strategies but not in the way that we looked at them...I did find the skills useful, especially the positive thinking. I can’t remember the other one’s that we covered...I am not the most strong willed person when it comes to fitness...It was good for me to learn some of these motivation strategies, although when you have three kids and a family, its not totally realistic to expect instant success."
Enabling Factor "Working part-time with three kids and all the demands of running a home does not release me as much as I'd like. Therefore planning a time for exercise seems a little unrealistic although I do try and get a walk on Saturday morning when things are a little quiet at home...My husband doesn't do much exercise anymore and isn't that bothered about me doing it either. He works long hours at the lab and doesn't expect to do much when he gets home...He did cooperate begrudgingly for me to attend the course, but otherwise that's the only thing that I have done for myself other than the independence of my part-time job...It isn't a reflection of the course, I think the strategies are a good idea but they would be far easier for some people than others."

Reinforcing Factor "I do feel better when I have had a walk to the shops and occasionally after work, especially getting in the fresh air away from the demands of everyday life. Actually, the relaxation stuff has been good during these times to enjoy a comfortable walk."
APPENDIX E

Intervention Program
Program Aims and Objectives

The aims of the program were to empower the participants with the knowledge, attitude and specific skills to self-direct the maintenance of regular exercise. Using Green and Kreuter’s Precede framework, the following learning objectives were intended to be achieved by the end of the program:

PREDISPOSING FACTOR

Knowledge

(1) be able to identify a range of self-regulatory strategies that can enhance exercise adherence.
(2) be able to identify personal barriers and high risk situations that can prevent regular exercise.
(3) increase declarative and procedural knowledge of the self-regulatory strategies.

Beliefs

(1) believe that these strategies will improve exercise adherence.
(2) believe that they are capable of learning to apply these strategies.
(3) believe that when they apply these strategies it will result in increased adherence to exercise.

ENABLING FACTOR

Skills

(1) be able to use a variety of motivational aids.
(2) be able to set appropriate goals.
(3) be able to plan a prioritized timetable.
(4) be able to reduce tension during exercise.
(5) be able to use imagery during exercise.
(6) be able to control focus during exercise.
(7) be able to apply positive thinking before, during and after exercise participation.
(8) be able to construct an exercise game-plan that copes with barriers and high-risk situations that can prevent exercise.

REINFORCING FACTOR

(1) be able to monitor the progress of their exercise goals using variety of self-directed sources.
PROGRAM OUTLINE: COGNITIVE-BEHAVIORAL SKILLS HEALTH EDUCATION PROGRAM

SESSION (1) INTRODUCTION
Lifestyle and physical activity
Motivation and physical activity
Introduction to self-regulatory strategies
Profiling exercise behavior

SESSION (2) EXERCISE AND SELF-MONITORING
Total fitness and physical fitness
The principles of training
The body’s response to exercise

SESSION (3) MOTIVATION (I)
Goal setting
Time management
Self-monitoring exercise goals

SESSION (4) MOTIVATION (II)
Motives for exercise participation
Motivational aids
Planning and exercise

SESSION (5) TENSION CONTROL AND RELAXATION
Stress response
Stress management strategies
Tension control and exercise

SESSION (6) IMAGERY
Types of imagery
Imagery mechanisms
Uses of imagery
Imagery and exercise

SESSION (7) FOCUSING, EFFORT AND EXERCISE
Attention control
Dimensions of attention focus
Attention focus and effort perception
Dissociation and health related exercise

SESSION (8) POSITIVE THINKING
Thoughts, feelings, and actions
Symptoms of high and low confidence
Positive self-talk and exercise

SESSION (9) APPLIED STRATEGIES
Barriers and solutions to exercise participation
Action plan for exercise adherence
Discussion: motivation and exercise adherence
SESSION GUIDE (1) INTRODUCTION

(1) Exercise Behavior Questionnaire (ASSESSMENT)

(2) Group and Instructor introductions.

(3) Course aims and objectives.

(4) Course outline.

(5) Workshop format:
   a) Questions to be addressed in session
   b) Session aims and objectives
   c) Theory
   d) Practice
   e) Application
   f) Understanding

(6) Group expectations.

(7) Session (1) aims and objectives.

(8) Introduction to exercise adherence, motives for participation, relapse prevention, motivational aids, and self-regulatory strategies.

(9) Introduction to unsupervised health related aerobic exercise and local route-planning around Acadia Park facilities.

(10) Physical, mental and social benefits of exercise - Group work.

(11) Feedback, discussion, summary.
SESSION GUIDE (2)  EXERCISE PHYSIOLOGY AND SELF-MONITORING

(1) Questions from previous session to be addressed.

(2) Session (2) aims and objectives.

(3) What is health? - discussion and summary.

(4) Total fitness defined.

(5) Physical fitness defined on a continuum.

(6) Who is physically fit?

(7) The components of physical fitness.

(8) Suppleness, strength and stamina (SSS):
   a) defined
   b) requirements in everyday life - Group work
   c) training for improvement

(9) Principles of training.

(10) Incorporating SSS exercise into an active lifestyle - Group work.


(12) Feedback, discussion, summary.
SESSION GUIDE (3) MOTIVATION TECHNIQUES (I)

Goal setting, self-monitoring, and time management.

(1) Questions from previous session to be addressed.
(2) Session (3) aims and objectives.
(3) What is motivation? - group work
(4) Motivation defined.
(5) Personal and situational factors that affect motivation.
(6) Goal setting introduction.
(7) Effective and ineffective goal setting and performance.
(8) Product and process goals.
(9) Principles of goal setting.
(10) Goal setting procedure.
(11) Self-monitoring and goal setting.
(12) Goal setting exercises:
   a) Exercise and sport goals - group work
   b) Life goals (physical, mental, social, family, personal lifestyle) - group work
   c) Health goal setting sheet - personal
   d) Exercise goal setting - personal
   e) Life goals - personal
(13) Introduction to Time Management.
(14) Prioritizing and timetabling exercise - personal.
(15) Feedback, discussion, summary.
SESSION GUIDE (4) MOTIVATION (II)

The Exercise game-plan and motivational aids

(1) Questions from previous session to be addressed.

(2) Session aims and objectives.

(3) Personal and situational factors to consider for the game plan.

A) Situational factors e.g., the type of activity or activities that you are going to do, and in what sequence, how long you are going to participate for in each activity or sequence, what route or environment you are going to participate in. Also plan an alternative (plan "B") in case of unforeseen obstacles (e.g., the weather, distractions etc.). Therefore, include flexible goal setting and time management.

Return to your goal setting and time management schedule and note if there is flexibility to adjust if necessary. Increase existing daily physical activity e.g., go to the shops and use the stairs etc.

B) Personal factors: Identify cognitive strategies to suit mood states:

i) list of events one would like to excel in.

ii) list of people to meet with, successfully.

iii) list of problems to successfully solve: past, present and future.

iv) list of idyllic scenes or images.

v) list of issues to self-discuss: politics, spiritual, Family.

vi) list of favorite songs.

vii) how you would spend a $200,000 lottery win.

(4) Introduction to Stimulus Control.

(5) List posters, images, phrases, or quotes for cue cards.

(6) List motives and solutions why people drop-out of participation in regular exercise - group work

(7) Feedback, discussion, summary.
SESSION GUIDE (5) STRESS, RELAXATION AND EXERCISE

(1) Questions from previous session to be addressed.

(2) Session (4) aims and objectives.

(3) What is stress? – Task sheet

(4) Fight or flight.

(5) Stages of stress.

(6) Stress and illness.

(7) Stress, thoughts, feelings and behavior.

(8) Measuring stress.

(9) Arousal management and performance.

(10) Introduction to relaxation.

(11) Relaxation methods and practice.

(12) Stress management strategies.

(13) Exercise and tension control.

(14) Feedback, discussion, Summary.
SESSION GUIDE (6) IMAGERY

(1) Questions from previous session to be addressed.

(2) Session (5) aims and objectives.

(3) Imagery defined and introduction.

(4) Imagery types.

(5) Imagery mechanisms

(6) Uses of imagery.

(7) Imagery practice.

(8) Imagery, mood states and exercise participation.

(9) Imagery practical

(10) Feedback, discussion, summary.
SESSION GUIDE (7)  ATTENTION CONTROL

(1) Questions from previous session to be addressed.

(2) Session (6) aims and objectives.

(3) Concentration and attentional focus defined.

(4) Practice dimensions of attentional focus.

(5) Attentional focus: Personal and situational differences.

(6) Stress, fatigue, confidence and attentional focus.

(7) Attentional focus and exercise.

(8) Introduction to association and dissociation strategies.

(9) Distraction training and concentration.

(10) Examples of incorrect focus during exercise.

(11) Attentional focus and exercise practical.

(12) Feedback, discussion, Summary.
SESSION GUIDE (8) POSITIVE THINKING

(1) Questions from previous session to be addressed.

(2) Session (7) aims and objectives.

(3) What is positive thinking?

(4) Symptoms of high and low confidence.

(5) Attributions and cognitive restructuring.

(6) Positive self-talk and exercise

(7) Confident; thoughts, feelings and behaviors during exercise participation.

(8) Feedback, discussion, summary.
SESSION GUIDE (9)  APPLIED COGNITIVE-BEHAVIORAL STRATEGIES: THE EXERCISE GAME-PLAN

(1) Questions from previous session to be addressed.

(2) Session (8) aims and objectives.

(3) Obstacles and strategies during the preparation, action and recovery stages of exercise participation.


(5) Relapse prevention training re-visited.

(6) Course quiz and discussion.

(7) Profiling of exercise behavior questionnaire.

(8) Course evaluation.
APPENDIX F

Control Group Program
CONTROL GROUP: PROGRAM OUTLINE FOR THE STANDARD HEALTH EDUCATION PROGRAM

1) Health and Fitness Issues
2) Structure of the Body
3) Benefits of Exercise
4) Back Pain and Injury Prevention
5) Healthy Eating
6) Weight Control
7) Stress and Society
8) Stress Management
9) Coronary Heart Disease

The control program is a broad-based health awareness course. The format of this course involves a short lecture and discussion which focuses on information and issues, rather than on the skill acquisition for the initiation and maintenance of health behaviors. The material delivered during these sessions is traditional health information from the Health Education Authority: Look After Yourself (Lifestyles Program). The aim of this course is to increase the clients knowledge and understanding with respect to a variety of health topics.

The following is an overview of each session. Lessons plans in greater detail can be obtained from the author.
SESSION (1) CONTROL GROUP INTRODUCTION

(1) Project consent form and Exercise Behavior questionnaire.

(2) Group and Instructor introductions.

(3) Course aims and objectives.

(4) Course outline and booklet.

(5) Workshop format:
   a) Questions to be addressed in session
   b) Session aims and objectives
   c) Theory and video material
   d) Discussion

(6) Session aims and objectives.

(7) Group expectations.

(8) Discussion: what is health? who is healthy?

(9) Introduction to the concept of health.

(10) Video. Healthy living

(11) Feedback, discussion, summary.
SESSION (2)  STRUCTURE OF THE BODY

(1) Questions from previous session to be addressed.

(2) Session aims and objectives.

(3) Introduction to physique description

(4) Introduction to the skeletal system

(5) Introduction to the muscular system

(6) Introduction to the cardio-respiratory system

(7) Introduction to exercise physiology

(8) Video. Structure of the body

(9) Quiz. Structure of the body

(10) Feedback, discussion, summary.
SESSION (3) PHYSIOLOGY OF EXERCISE

(1) Questions from previous session to be addressed.

(2) Session aims and objectives.

(3) Total fitness defined.

(5) Physical fitness defined on a continuum.

(6) Who is physically fit?

(7) The components of physical fitness.

(8) Suppleness, strength and stamina (SSS):
   a) defined
   b) requirements in everyday life - Group work
   c) training for improvement

(9) The body's response to aerobic exercise

(10) Principles of training.

(11) Physical, mental and social benefits of exercise - Group work.

(12) Feedback, discussion, summary.
SESSION (4) BACK PAIN AND INJURY PREVENTION

(1) Questions from previous session to be addressed.

(2) Session aims and objectives.

(3) Introduction to the prevalence of back pain in industrial societies.

(4) Introduction to the structure of the spine.

(5) Factors that cause back pain.

(6) Introduction to injury prevention

(7) Video. Injury prevention and physical fitness.

(8) Feedback, discussion, summary.
SESSION (5) STRESS AND CONTEMPORARY SOCIETY

(1) Questions from previous session to be addressed.
(2) Session aims and objectives.
(3) Discussion. What is stress?
(4) Introduction to the stress and contemporary society.
(5) The effects of stress on thoughts, feelings, and behavior.
(6) Stress and illness.
(7) Video. Stress and Lifestyle
(8) Feedback, discussion, summary.

SESSION (6) STRESS MANAGEMENT

(1) Questions from previous session to be addressed.
(2) Session aims and objectives.
(3) Assessing one's level of stress
(4) Discussion. Attitudes, actions, and combatting stress
(5) Lifestyle case studies and reducing stress
(6) Video. Stress management.
(7) Feedback, discussion, summary.

SESSION (7) HEALTHY EATING

(1) Questions to be addressed.
(2) Session aims and objectives.
(3) Introduction to healthy eating and the twentieth century lifestyle.
(4) Essential nutrients and food choices.
(5) Information on food labels
(6) Video. Healthy Eating
(7) Feedback, discussion, summary.
SESSION (8) WEIGHT CONTROL

(1) Questions from previous session to be addressed.
(2) Session aims and objectives.
(3) Problems associated with being overweight
(4) Methods used to describe weight.
(5) Introduction to the energy balance
(6) Solutions to reducing fat in one's diet.
(7) Video. Weight control
(8) Feedback, discussion, Summary.

SESSION (9) HEALTH AND CORONARY HEART DISEASE (CHD)

(1) Questions from previous session to be addressed.
(2) Session aims and objectives.
(3) Introduction to the structure and function of the heart
(4) Introduction to heart disease.
(5) Lifestyle and the twentieth century
(6) Introduction to CHD risk factors
(7) Lifestyle case studies and solutions
(8) Quiz.
(9) Feedback, discussion, summary.
(10) Profiling of exercise behavior questionnaire.
(11) Course evaluation.
APPENDIX G

Precede-Proceed Model
The Precede-Proceed Model for Health Education Planning and Evaluation (Green and Kreuter 1991).