# PHYSICAL ACTIVITY INTERVENTION
# FOR SEDENTARY FEMALE HIGH SCHOOL STUDENTS

By

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# ABSTRACT

## PHYSICAL ACTIVITY INTERVENTION FOR SEDENTARY FEMALE HIGH SCHOOL STUDENTS

Despite the abundant research that has documented the benefits of physical activity, over half of Canadian youth are not physically active enough for optimal growth and development to occur (CFRLI, 2002). The school setting is the ideal public health vehicle for promotion of physical activity, since all children and youth attend school and have exposure to physical education programs.

This study designed and implemented an intervention to increase participation in physical activity among sedentary high school girls. A peripheral purpose was to evaluate the effectiveness of a behavioral promotion program as an alternative to traditional physical education classes. It used both qualitative (author reflection) and quantitative analyses (a pre-test/post-test research design over nine weeks). The study consisted of three parts: the pre-test, the intervention (eight sessions), and the post-test.

The Stages of Change questionnaire was used to screen pre-contemplators, contemplators, and students in preparation stage into the study. It was hypothesized that as participation in physical activity increased in participants, their stage of change would also change. The quantitative measures were the modified Canada Fitness Survey, the exercise self-efficacy scales, and the exercise self-schemata scale. The intervention focused on enhancing self-efficacy and self-schemata for physical activity. Various cognitive behavioral approaches (i.e. self-monitoring, goal-setting) were used in the intervention. The quantitative results were analyzed by using a repeated-measures analysis of variance.

Qualitative data were obtained from participants' written and oral responses to questions asked during intervention sessions, and the researcher's observations and reflections of their progress. The researcher engaged the participants, individually and as a group, seeking to gain a sense of the feelings and meanings assigned to their involvement in the study. Qualitative results are categorized as themes.

At the end of the intervention, the participants' amount of physical activity increased (but not statistically significant). They also indicated a strengthened belief in their ability to overcome barriers to physical activity and to prevent relapse from happening. The small number of participants led to insignificant quantitative results in self-efficacy. The intervention was also limited by a condensed time frame and its "extra curricular" nature. Successful interventions should be run for the duration of the course as weekly meetings during regular class time and should include moderate physical activity as the main activity. Further studies to explore the "gender suitability" of this type of intervention, the causal relationship between exercise behavior, exercise self-efficacy, and exercise self-schema, and the restructuring of high school physical education curriculum are recommended to achieve the goal of promoting lifelong participation in physical activity.

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# CHAPTER 1

# INTRODUCTION

Physical activity has many benefits. A recent report by UK Department of Health (2004) identified the following benefits of physical activity for adolescent health:

- During childhood, physical activity can enhance healthy growth and development, maintenance of energy balance, psychological well-being and social interaction.
- Physical activity helps to prevent excess weight gain during childhood and help overweight children to lose weight.
- Activities that produce high physical stress on the bones (i.e. jumping, skipping, and aerobics) can help to increase bone mineral density and provide protection against osteoporosis in later life.

Further more, the UK Department of Health (2004) report indicates that individuals will continue to reap the benefits of physical activity into adulthood:

- Physical activity provides protection against coronary heart disease in men and women. The risk of dying from coronary heart disease is almost doubled in inactive people compared to physically active people. Physical activity also reduces the risk of stroke significantly.
- Physical activity helps to reduce the effect of several risk factors for cardiovascular disease, such as raised blood pressure, adverse blood lipid profiles, and insulin resistance.

According to statistical data provided by the Canadian Fitness and Lifestyle Research Institute (CFLRI), over half (56%) of Canadians between ages five to 19 are not active enough to achieve optimal growth and development (CFLRI, 2002). A more disturbing

trend is that Canadian girls are significantly less active than boys with only 38% of girls (age five to 12) and 30% of adolescent girls (age 12 to 17) considered to be active enough for optimal growth and development (compared to 48% of boys and 40% of adolescent boys) (CFLRI, 2002). This trend of lower participation in physical activity by females continues into adulthood with higher participation for men than women (Trost, Owen, Bauman, Sallis, & Brown, 2002). In Canada's Physical Activity Guide for Youth, it is recommended that "inactive children and youth increase the amount of time they currently spend being physically active by at least 30 minutes more per day" and decrease the time they spend being sedentary (CFLRI, 2002). All of the above facts point to the need for increasing physical activity among adolescent girls.

The traditional model of school physical education tends to focus on health-related fitness, individual activity, and team or dual sports (CFLRI, 2003). At least 85% of schools in Canada attempt to equally emphasize participation, leadership and social skills, lifelong physical activity skills, and positive attitudes. However, only leadership skills are most commonly emphasized (CFLRI, 2003).

Missing in the current curriculum of physical education is preparation for life-long participation in physical activity. Indeed, the current physical education program is not reaching all students, with 70% of adolescent girls and 60 % of adolescent boys not active enough to achieve health benefits (CFLRI, 2002). It is found that secondary schools are likely to report that the majority of students are inactive during any break from class (e.g. lunch time) (CFLRI, 2003). Most schools only show a low to moderate level of support for integrating physical activity into broader school life (CFLRI, 2003).

Therefore, an alternative approach to physical education is warranted for the portion of students who are not physically active.

Since physical activity is so beneficial, it is important to understand its determinants/correlates. Although the terms of determinants and correlates are often used synonymously, determinants come from longitudinal studies and correlates are derived from cross-sectional studies (Carron, Hausenblas, & Estabrooks, 2003). Both terms refer to variables that are related to physical activity. However, the term determinants will be used in this thesis. Results of determinant studies can be used to target interventions for high-risk groups such as adolescent females and to guide interventions to modify factors that control behavior. The youth determinants research suggests that interventions that provide enjoyable activities, build self-efficacy and reduce perceptions of barriers will be relatively effective (Sallis & Owen, 1999).

In a review of literature of determinants affecting physical activity in adults, Trost and colleagues (2002) identified six major categories of determinants: demographic and biological factors; psychological, cognitive, and emotional factors; behavioral attributes and skills; social and cultural factors, physical environment factors; and physical activity characteristics. The United States Surgeon General's Report (1996) identified five main determinants of physical activity: self-efficacy, enjoyment, support from others, positive beliefs about the benefits of physical activity, and lack of perceived barriers to being physically active. Self-efficacy was found to be repeatedly related to physical activity (Sallis & Owen, 1999, Trost et al., 2002).

Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of

performances" (p.391) and proposed self-efficacy as the most powerful determinant of behavior. In Trost and colleague's (2002) review, self-efficacy is identified repeatedly to have a positive association with physical activity.

McAuley (1992) advocated for the examination of self-efficacy in relation to other psychological variables in a physical activity context, as a necessary step toward understanding the role of self-efficacy as a mediator of behavior change. One such psychological variable of interest is self-schema, as noted below.

One way that an individual constructs a generalized view of him/herself is by organizing self-relating information in a cognitive structure called a self-schema. "Self-schema" is a "cognitive generalization about the self, derived from past experience, that organizes and guides the processing of self-related information contained in the individual's social experiences" (Markus, 1977, p. 64). Self-schemas are theories about the self, developed from repeated categorizations and evaluations of behavior by oneself and others. These result in a clearly differentiated idea of the kind of person one is with respect to a particular domain of behavior (e.g., creativity, musicality, etc.). Self-schemas enable individuals to understand their own social experiences and to integrate a wide range of stimulus information about the self into meaningful patterns. They also direct attention to behavior that is informative regarding aspects of the self (Markus & Smith, 1981). Such generalized views may be important determinants of exercise behavior (Biddle & Mutrie, 2001).

Behaviors can be changed or modified (Martin, 2003). Physical activity behavior can be increased through behavioral interventions using skills such as goal setting and self-monitoring, among others. (Marcus & Forsyth, 2003). Sallis & Owen (1999)

advocate that interventions should try to: a) increase awareness of the importance of physical activity, b) increase the likelihood of individuals participating in physical activities, and c) help individuals make physical activity a lifelong habit. Biddle and Mutrie (2001) identify secondary school-based interventions as a research priority. In a report produced by CFLRI (2003), it is also recommended that strategies in schools be used to increase physical activity.

Interventions based on theories of behavior change, which teach behavioral skills that are fitted to the individual's needs, are associated with longer-term changes in behavior (U.K. Department of Health, 2004). A useful tool in developing interventions is the Transtheoretical Model of behavior change (TTM) which includes the stages of change. The stages of change can be used in designing interventions, by selecting strategies that coincide with the stage of change.

## Statement of Problem

This study designed and administered a cognitive behavioral intervention for sedentary high school girls. The purpose of the intervention was to increase physical activity participation and two important determinants of physical activity: self-efficacy and self-schema.

The stages of change model was used to screen participants into the study. The study used both qualitative and quantitative methods to analyze participants' changes in self-referent thoughts and feelings and meanings associated with physical activity after an eight-week intervention which were held during school time. A further purpose of this study was to evaluate the effectiveness of the design and delivery of a behavioral program as an alternative to traditional physical education classes.

## Rationale

This intervention focused on teaching participants cognitive behavioral skills such as goal-setting and self-monitoring. McAuley (1992) stated that goal-setting and self-efficacy are related – success in reaching goals enhances self-efficacy of individuals. The intervention strived to increase participants' self-confidence about their ability to become and stay physically active.

Whereas much research has investigated self-efficacy as a mediating factor that is predictive of both intentions and participation in physical activity (Biddle & Mutrie, 2001), little research has investigated newer perspectives like exercise self-schema. Self-efficacy and self-schema are seemingly related since both are identified as mediators that influence physical activity motivation and participation (Biddle & Mutrie, 2001). However, no study has been located that yields a clear picture of how the two are related. This is due to the lack of study involving both exercise self-efficacy and exercise self-schema as variables in the same study.

Kendzierski (1994) is one of the few researchers who has carried out studies on self-schema. Although the present study was a preliminary (pilot) study with a limited number of participants, it was valuable to see if the relationship among self-efficacy, self-schema, stage of change, and participation in physical activity. In addition, since self-schema has never been studied in conjunction with other psychological variables in a physical education setting, this study yielded important information regarding exercise self-schema.

The intervention developed in this study served as a pilot intervention administered in a "field" setting with a sample from an actual student population. The

main contributions of this study were to experiment with the delivery of an intervention within the constraints of a high school timetable (i.e. semester system), and to offer an alternative approach to a traditional physical education program. It was designed to increase participation in physical activity outside of school, not a focus of most physical education programs.

Biddle and Mutrie (2001) described three benefits of targeting schools for physical activity interventions: 1) Interventions will take place during a critical age range when it is more possible to bring about changes. 2) School-wide strategies allow for the targeting of all members of the age group, if applicable. 3) Delivery of an intervention can be facilitated by the delivery structure (of the regular physical education program) already in place.

## Definitions of Terms

The following terms are relevant to the study. More detailed references to each term and its relevance are found in the literature review.

Physical activity: any "bodily movement produced by skeletal muscles that results in energy expenditure" (Sallis & Owen, 1999, p.10).

Exercise: a form of physical activity that includes activities that are planned, structured, and repetitive (Marcus & Forsyth, 2003).

Determinants: "the factors that affect, or are thought to affect, participation in exercise and physical activity" (Biddle & Mutrie, 2001, p. 9).

Self-efficacy: "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391).

Self-schema: "cognitive generalizations about the self, derived from past experience, that organizes and guides the processing of self-related information contain in the individual's social experiences" (Markus, 1977, p. 64).

Transtheoretical model: developed by Prochaska and DiClemente (1983), this model provides a framework for understanding and exploring an individual's motivation for changing his/her physical activity habits, the barriers to change (cons), the benefits of change (pros), and specific strategies and techniques for promoting change (Marcus & Forsyth, 2003).

Stages of change: the key concept in the Transtheoretical Model that describes how people vary in their levels of motivation to change. There are five stages of readiness including pre-contemplation, contemplation, preparation, action, and maintenance (Marcus & Forsyth, 2003).

Processes of change: these are the strategies and techniques that individuals use to alter their behavior. The processes of change describe how people change. The processes are divided into cognitive (thinking, attitudes, awareness) and behavioral (actions) categories (Marcus & Forsyth, 2003).

## Delimitations

This study involved only Grade 10 female adolescents who were screened by the stage of change questionnaire to be in the pre-contemplative, contemplative, or preparation stage of motivational readiness. The length of the intervention was designed to fit within the half-semester physical education class scheduled from April to June at the site (high school) of study.

## Limitations

Since participants were recruited on a voluntary basis, the study was vulnerable to participant attrition. The outdoor activities that were part of the intervention design were dependent on weather and occasionally had to be moved indoors due to unsuitable outdoor conditions. The variety of indoor activities was limited by the availability of facilities and equipment at the high school (i.e. availability of school gymnasium). Due to the researcher's teaching schedule and class schedule of the participants, the intervention could only be conducted during lunch hour on designated dates.

The qualitative research method meant that the study could only attempt to answer "what" and "how" questions and would not aid in prediction (Benner, 1994). Qualitative research makes no claim of generalization; it deals with one case relative to another. Conclusions are left to the reader, derived from the views of the participants and in this case, the researcher, as instrument. The data generated could not be used to establish causal relationship between exercise behavior, exercise self-efficacy, and exercise self-schema. The small number of participants in the study limited the ability of the quantitative data to achieve statistical significance.

# CHAPTER TWO

# REVIEW OF LITERATURE

This chapter provides a review of relevant literature. Beginning with an outline of the behavioral epidemiology framework, as applied to research in physical activity and health, and is followed by an overview of social cognitive theory and cognitive behavior techniques that provide the framework for the intervention strategies. A discussion of self-efficacy and self-schema, the two determinants of physical activity included in the study is also presented along with a description of the stages of change. Finally, a review of an adult behavioral intervention (Project Active) (Sallis & Owen, 1999), and two school-based interventions (Project SPARK and CATCH) concludes the chapter.

## Behavioral Epidemiology Framework for Physical Activity

The conceptual underpinning for this study is a behavioral epidemiology framework. The main purpose of applying behavioral epidemiology is to identify the various types and cause(s) of behavior that lead to physical activity and promotion of physically active lifestyles (Sallis & Owen, 1999). Sallis and Owen (1999) proposed a five-phase framework to accomplish these goals.

The conceptual framework is outlined below, with a more detailed description of each phase. The study focused on the fourth phase of this framework, namely evaluating intervention to promote physical activity. It is worth stating that research in all phases of the framework is crucial to achieving the goal of physical activity promotion.

Phase 1: Establish the links between physical activity and health.

Phase 2: Develop methods for accurately measuring physical activity.

Phase 3: Identify factors that influence the level of physical activity.

Phase 4: Evaluate interventions to promote physical activity.

Phase 5: Translate research into practice. (Sallis & Owen, 1999)

**Phase 1: Establish the links between physical activity and health.**

Considerable research (Blair, La Monte, & Nichaman, 2004, US Department of Health & Human Services, 1996) has shown that physical activity has many health benefits, include decreased risk of:

- All cause mortality
- Cardiovascular and coronary heart disease
- Type II diabetes
- Colon and breast cancer
- Developing depression

Physical activity also improves several risk factors for coronary heart disease and symptoms of other diseases, including:

- Blood pressure
- Blood lipids and lipoproteins (increases HDL or "good" cholesterol)
- Weight loss
- Blood glucose control in patients with Type II diabetes
- Symptoms of depression and anxiety

(Blair et al., 2004, US Department of Health & Human Services, 1996)

**Phase 2: Develop methods for accurately measuring physical activity.**

Physical activity is a very complex variable to measure because it can be further broken down into four sub-variables: frequency, intensity, time, and type (Sallis & Owen, 1999). Since researchers are often interested in measuring physical activity as a pattern of

behavior, the use of self-report measures, questionnaires and interviews are most common with youth (Sallis & Owen, 1999).

Questionnaires and interviews can be used to gather information about habitual physical activity (Montoye, Kemper, Saris, & Washburn, 1996). They often contain various forms of questions such as: open-ended items, and Likert-scale items. The advantages of using questionnaires or interviews are that they are inexpensive to use and a large amount of data can be gathered at the same time (Montoye et al., 1996). Montoye and colleagues (1996) offers the following guidelines for developing questionnaires/interviews for young subjects:

1. The questionnaire should assess leisure time physical activities.
2. The questionnaire should make it possible to place participants into three to five categories on the basis of habitual physical activity.
3. Both weekends and weekdays should be covered because the activities of some individuals may vary throughout the week and the weekend may in fact show a change in activity pattern.

**Phase 3: Identify factors that influence the level of physical activity**. Age and sex are considered the most dominant biological determinants of youth physical activity. Studies have shown that there is a dramatic decline in physical activity during youth, and that "boys are almost always found to be more physically active than girls" (Sallis & Owen, 1999, p. 129). Other important determinants include psychological, cognitive, and emotional factors, which are discussed under the topic "intrapersonal variables influencing physical activity" in this chapter.

**Phase 4: Evaluate interventions to promote physical activity**. Through a meta-analytic review of 127 intervention studies (Sallis & Owen, 1999), the following intervention characteristics result in a large effect size ($\geq 0.50$):

- Using interventions based on principles of behavior modification.
- Setting low- to moderate-intensity goals.
- Focusing on increasing activity during leisure time as the main activity goal of the intervention.

**Phase 5: Translate research into practice**. This last, most important step considered within the behavioral epidemiology framework is largely due to the direct impact it has on public health. There needs to be a focused effort to explore better adoption of intervention programs in schools and other sites (Sallis & Owen, 1999).

## Theoretical Approaches

Psychological research focusing on physical activity has adopted an increasingly cognitive orientation (McAuley, 1992). The social-cognitive framework indicates that "behavior and human functioning are determined by the interrelated influences of individuals' physiological status, behavior, cognition, and the environment" (McAuley, 1992, p. 108), and are outlined below.

### Social Cognitive Theory

Social-cognitive theory includes self-efficacy which explains the cause of behavior as a result of reciprocal interactions between the behavior itself, and physiological, cognitive, and environmental factors. This phenomenon is termed "reciprocal determinism" (McAuley, 1992). The use of a social-cognitive approach is an

attempt to connect the antecedents and consequences of physical activity behavior in a reciprocal and dynamic, rather than a unidirectional manner (McAuley, 1992). Social cognitive theory highlights the interactions between intrapersonal, social, and physical environment influences on behavior (Sallis & Owen, 1999) and forms the basis of many successful behavioral strategies used in physical activity interventions. This intervention study was grounded in the concepts of cognitive behaviorism.

Social cognitive theory was put forth by Albert Bandura (1986) in the book *Social Foundations of Thought and Action: A Social Cognitive Theory*. The theory uses cognitions in the context of social interactions and behavior to explain human action, motivation, and emotion. The main variables in social cognitive theory are outcome expectancies, outcome value, intention, and self-efficacy expectancy (Buckworth & Dishman 2002).

Outcome expectation is the belief one holds about the effects/consequences of a behavior (Maddux, 1995). This can be interpreted as the perceived benefits of a behavior. Benefits (desired outcomes) and costs (undesired outcomes) have different effects on an individual's behavior. Outcome values refer to the different degrees of reinforcement value. Intention is what one indicates he/she will do (Buckworth & Dishman, 2002).

Social cognitive theory suggests that behavior is the outcome of social learning, intrapersonal characteristics and environment, interacting to influence behavior and vice-versa (McAuley, 1992). Behavior (type, frequency, duration, intensity) is influenced by and influences intra-personal factors (e.g. self- efficacy, attitudes, emotions). An individual's attitudes and self-efficacy beliefs influence the behavior he/she produces and the effectiveness of outcome behavior serves to shape the individual's attitudes and

beliefs (Carron et al., 2003). For example, highly efficacious individuals have been shown to attribute failure to lack of effort, whereas less efficacious individuals tend to attribute failure to the lack of ability, which is consistent with low self-efficacy (McAuley, 1992). An implication of the triadic reciprocal causation perspective is that self-efficacy can be influenced through social persuasion as well as the success of (similar) others (Carron et al., 2003).

Behavior Modification

Behavior modification approaches have been found to be the most effective type of physical activity intervention (Sallis & Owen, 1999). However, they require a "one-on-one" approach where someone must always be present to provide reinforcement (Carron et. al., 2003). This makes the use of behavior modification impractical and potentially costly for large-scale interventions. A more realistic approach is the use of cognitive behavioral techniques which involve the teaching of behavioral skills in a group setting, where participants learn the skills together (Carron et. al., 2003). The cognitive behavioral techniques used in this study are based on the principles of behavior modification as briefly described below.

Types of antecedents and consequences predicted to affect exercise behavior include environmental (e.g. weather, media, time), social (i.e. friends, family support), cognitive (i.e. thoughts, attitude, self-efficacy), physiological (i.e. gender, fitness, ability), and personal (i.e. exercise history, education, personality) (Buckworth & Dishman, 2002). Changing antecedents is called stimulus control, and consequences are either reinforcers (rewards) or punishers. Physical activity promotion programs need to provide reinforcers for being active and find ways of removing or reducing punishers (Sallis &

Owen, 1999). The most important characteristics of a behavioral approach are a strong emphasis on defining goals in terms of behavior that can be measured in some way, and on using changes in the behavioral measure as the main indicator of the extent to which the individual is being helped (Martin, 2003).

Although altering consequences is the most powerful method for changing behavior (Sallis & Owen, 1999), there are several drawbacks of behavior modification. Firstly, little attention has been given to cognitive processes, affect, or motivation as influencing factors of human behavior (Buckworth & Dishman, 2002). Secondly, because of the need to ensure suitable reinforcers are immediately available after the antecedent, behavior modification programs require close monitoring by the person administering rewards. This means that personal contact must be maintained and is impractical for group interventions. It is also a very costly undertaking to employ qualified personnel to work on a one-to-one basis. Another consequence is that the desired behavior may diminish once the reinforcement/reward is removed (extinction) (McAuley, 1992).

Cognitive Behavioral Techniques

Cognitive behavioral techniques share some assumptions with behavior modification techniques in that stimulus and response are key to explaining behavior (Buckworth & Dishman, 2002). However, cognition is defined as the critical mediating variable (mediator) of behavior. A mediator represents the mechanism through which the intervention is believed to influence physical activity behavior and a mediator is a factor that can help promote change (Marcus & Forsyth, 2003). Learning can serve to restructure, enhance, or replace faulty thoughts with behaviorally effective beliefs and

cognitive skills. Since cognitions moderate behavior and cognitions can be changed, the key to changing behavior is to change thoughts (Buckworth & Dishman, 2002).

The main advantage of using cognitive behavioral techniques as a basis for an intervention is that participants will learn about new skills in self-regulation and management, to the point where they no longer need someone to administer the reinforcements. This makes the intervention "empowering" to the participants (they are learning new skills) and also allows for large group administration of the intervention.

One strategy based on cognitive behaviorism is cognitive restructuring. During cognitive restructuring, cognitions that limit the likelihood of positive action are identified (e.g. low exercise self-efficacy) initially. Then, attempts are made to change/modify the cognitions by employing various strategies such as self-monitoring and goal setting (Buckworth & Dishman, 2002). Previous studies have found that cognitive behavioral techniques offer the best possibility of long-term changes (Biddle & Mutrie, 2001).

## Determinants of Physical Activity: Intrapersonal Variables

Interventions designed to influence behavior determinants will likely have an impact on the physical activity of the participants. The following will provide a detailed discussion of the intrapersonal variables included in this study.

### Self- Efficacy

It is important to note that self-efficacy is not concerned with the skills an individual possesses, but rather with the assessment of what an individual can do with his or her skills (McAuley, 1992). It can be thought of as a type of situation-specific self-confidence sometimes used to refer to one's general sense of competence and

effectiveness (Maddux, 1995). Self-efficacy influences human functioning through four psychological processes: cognitive, motivational, affective, and selective (Bandura, 1994).

Cognitive processes are thinking processes used in the gathering, sorting, and use of information. Self-efficacy influences cognitive processes by shaping the types of expectations that are constructed and rehearsed by individuals. A strong self-efficacy leads to positive visualizations that provide positive guides and supports for performance (Bandura, 1994).

Motivation is the activation to action. The level of motivation can be inferred from an individual's choice of courses of action, and in his or her intensity and persistence of effort (Bandura, 1994). Motivational processes can also be influenced by self-efficacy. Individuals' beliefs about what they can do affect their anticipation of what they consider to be likely outcomes of their actions. This anticipation forms their foundation for goal setting. Self-efficacy can also impact upon other motivational processes by influencing how much effort individuals expend, how long they persevere against obstacles, and how resilient they are to failures (Bandura, 1994).

Affective processes regulate an individual's emotional states and emotional reactions (Bandura, 1994). Whereas a strong sense of self-efficacy can lower the level of stress and anxiety one experiences, stress and anxiety can affect motivation and lead to avoidance behavior in individuals (Bandura, 1994).

Beliefs about personal efficacy can influence individuals' selection of activities and environments. People tend to choose to take part in activities that they feel capable of doing. By this selective process, they develop different competencies, interests, and

social networks that determine life courses (e.g. engaging in healthy lifestyle habits) (Bandura, 1994).

Primary Sources of Self-efficacy. In self-efficacy theory, beliefs about personal resources and abilities come from the interaction of information from six primary sources (Maddux, 1995):

1. Performance (mastery) experiences. In particular, clear successes or failures are the most powerful sources of self-efficacy. Success at a task, behavior, or skill strengthens self-efficacy for that task, behavior, or skill. Perceptions of failure diminish self-efficacy. Furthermore, an efficacy belief is more resilient if the individual has also had to overcome obstacles and adversity to achieve the outcome. Initial failures can potentially undermine efficacy beliefs (Carron et al., 2003). Thus mastery experiences are found to be the most dependable and influential sources of efficacy information for the individual (McAuley, 1992).

2. Vicarious experiences. (observational learning, modeling, imitation) influence self-efficacy when people observe the behavior of others, see what they are able to do, note the consequences of their behavior, and then use this information to form expectancies about their own behavior and its consequences (Maddux, 1995).

3. Imaginal experiences. People are capable of the anticipatory visualization of possible situations and events, their own behavioral and emotional reactions to these situations and events, and the possible consequences of their behavior. People can generate beliefs about personal efficacy or inefficacy by imagining themselves or others behaving effectively or ineffectively in future situations. Such images may be derived from actual or vicarious experiences with situations similar to the one anticipated, or they

may be induced by verbal persuasion. Imagining oneself performing successfully or unsuccessfully, however, is not likely to have as strong an influence on self-efficacy as an actual success or failure experience (Maddux, 1995).

4. Verbal persuasion (social persuasion). This is a less potent source of enduring change in self-efficacy than performance and vicarious experiences. For example, having the physical education teacher tell a student that she can be physically active is not as effective as having the student discover that she can be physically active by actually experiencing physical activity. The potency of verbal persuasion may be influenced by such factors as the expertness, credibility, and attractiveness of the source. Experimental studies have shown that verbal persuasion is only a moderately effective means for changing self-efficacy beliefs (Maddux, 1995).

5. Physiological states. When people associate aversive physiological arousal with poor behavioral performance, perceived incompetence, and perceived failure, their awareness of unpleasant physiological arousal cause them to become more likely to doubt their behavioral competence than if the physiological state were pleasant or neutral. Likewise, comfortable physiological sensations are likely to lead one to feel confident in one's ability in the situation at hand. In activities involving strength and stamina, perceived efficacy is influenced by such experiences as fatigue and pain, or the absence thereof (Maddux, 1995).

6. Emotional states. Emotional experiences are not simply the product of physiological arousal, but can be an additional source of information about self-efficacy. People are more likely to have self-efficacious beliefs about performance when their affect is positive than when it is negative (Maddux, 1995).

Distal (past) or proximal (current or immediate) experiences can be determinants of current self-efficacy beliefs. An individual's self-efficacy for a specific performance in a particular situation, measured at a specific time, will be the result of the interaction of distal and proximal information from all six sources (Maddux, 1995). In this sense, the construct of self-efficacy is domain-specific and operates along a continuum from "being incapable" to "being capable".

Measuring Self-efficacy. The construct of self-efficacy can vary along three dimensions (Carron et al., 2003). The "level" of self-efficacy reflects the individual's belief about his or her ability to perform a task or an aspect of a task. The "strength" of self-efficacy indicates the degree of conviction an individual has about whether a particular task or a component of a task can be carried out successfully. The "generality" of self-efficacy indicates the level of transfer of efficacy between similar tasks. Measurement of self-efficacy should be conducted by analyzing the evaluation of self-efficacy along these three dimensions (McAuley, 1992). However, it is rarely the case that each of these dimensions is measured. While many studies measure strength of self-efficacy, only a few measure level and generality (Biddle & Mutrie, 2001). Currently, there are limited tools to operationally measure all dimensions of self-efficacy.

Bandura (1986) has asserted that task-specific measures of self-efficacy (i.e. exercise self-efficacy) are more predictive of behavior and provide greater explanatory power than do more generalized measures. This has led to the development of domain-specific self-efficacy scales (e.g. exercise self-efficacy, sports self-efficacy). However, further research is needed to determine the face validity and reliability of some of these domain-specific measures.

Relationship between Physical Activity and Self-efficacy. Sallis and Owen's (1999) review of approximately 300 studies on adult physical activity determinants found a strong, consistent positive association between self-efficacy and physical activity. Trost and colleagues (2002) added 12 studies in their review that supported Sallis & Owen's (1999) findings. An important question is whether self-efficacy can in fact be increased. No studies located about adolescents have yielded conclusive results, but studies with sedentary 45-64 year olds have shown that exercise self-efficacy can be increased through intervention and can predict participation in early stages of an exercise program (Biddle & Mutrie, 2001).

Appling Self-efficacy Theory to Interventions. Self-efficacy theory provides clear possibilities for intervention, based on the sources of efficacy information (Biddle & Mutrie, 2001). They proposed the following guidelines for interventions aimed at promoting health-related activity:

1. Interventions must be packaged in the form of enjoyable and reinforcing physical activity where individual perceptions of mastery and intrinsic motivation are enhanced.

2. Interventions should provide opportunities that allow individuals to observe people of similar build and physical ability 'succeed' in exercise (vicarious experience).

3. Interventions should enhance personal perceptions of the costs and benefits of exercise.

4. Interventions should provide individuals with greater awareness of physiological sensations of effort and pain to help individuals maintain an appropriate level of activity and to not misinterpret the physical responses to exercise.

In order to enhance self-efficacy, intervention programs must be developed to strengthen participants' beliefs in their capability to engage in and adhere to a physically active lifestyle (Carron et al., 2003). A combination of various strategies to provide the six sources of self-efficacy is expected to be potentially successful.

Successful efficacy interventions structure situations for participants in ways that will bring success and avoid situations where participants will likely encounter failure. They will also measure success in terms of self-improvement rather than a demonstration of superiority over others (Bandura, 1994).

Persistence with an exercise program is influenced by individuals' beliefs about their ability to make regular exercise part of their daily living. Individuals who experience early success in an exercise program develop strong beliefs of self-efficacy. As a result, they are more likely to persist than those who experience initial failure and feelings of low self-efficacy (Maddux, 1995). "Studies have found that self-efficacy predicts exercise behavior at different stages of exercise experience, and that the relative influence of self-efficacy and outcome expectancy may change with experience" (Maddux, 1995, p.178). This finding implies that self-efficacy beliefs regarding physical activity can be influenced by individuals' experiences in an intervention program, and an improved sense of self-efficacy will increase likelihood of participation in physical activity.

Self-schema

"Self-schema" is defined as a "cognitive generalization about the self, derived from past experience, and organizes and guides the processing of self-related information contained in the individual's social experiences" (Markus, 1977, p. 64). Self-schema

represents certain patterns/characteristics of behavior that have been observed repeatedly, to the point where a cognitive framework is generated. This results in a clearly differentiated idea of the kind of person one is with respect to a particular domain of behavior (e.g., creativity, musicality, etc.). Such framework(s) allows one to make inferences from little information or to quickly interpret complex sequences of events (Markus, 1977). Self-schemas enable individuals to understand their own social experiences and to integrate a wide range of stimulus information about the self into meaningful patterns. They also direct attention to behavior that is informative of these aspects of the self (Markus & Smith, 1981).

Self-schema also forms the basis of regularity in behavior. The concept of self-schema implies that information about the self in some area (domain) has been categorized or organized and that the result of this organization is a pattern which may be used as a basis for formulating future judgments, decisions, inferences, or predictions about the self (Markus, 1977).

Self-schemas are said to be domain specific (e.g. artistic ability, athleticism). Individuals having self-schemas in particular domains are readily able to:

1. Evaluate the relevance of new information with regard to a specific domain.
2. Process information about the self in the given domain (e.g., make judgments and decisions) with relative ease or certainty.
3. Retrieve evidence of behavior fitting the given domain.
4. Anticipate future behavior in the domain.
5. Resist information that contradicts the prevailing schema. (Markus & Smith, 1981)

Development of Self-schemas. Self-schemas include both cognitive representations derived from specific events involving the individual, and more general representations derived from the repeated categorization and assessment of the person's behavior by the individual and others. An individual's attempts to make sense of his or her own behavior (to organize, summarize, or explain) in a particular domain result in the formation of self-schemas (Markus, 1977). A person must have repeated experiences in a given domain of social behavior or must have attended to behavior in this domain in order for him/her to develop an articulated self-schema (Markus, 1977).

Once established, self-schemas function as a selective tool/filter that determines what information is attended to, how it is structured, how much priority is attached to it, and how it is incorporated cognitively. As individuals accumulate repeated experiences of a certain type, their self-schemas become increasingly resistant to inconsistent or contradictory information (Markus, 1977).

Self-schema for Exercise. Schematicity is a cognitive framework that organizes and guides the processing of self-related information contained in the individual's social experiences (Markus, 1977). The acquisition of schematicity requires that individuals both view their behavior as very reflective of the attribute in question and consider the attribute an important part of their self-image (Kendzierski, 1994). Individuals are schematic in regard to a particular attribute when they consider the attribute to be extremely self-descriptive or extremely nondescriptive, and they consider that attribute extremely important to their self-image. Likewise, individuals are aschematic when they consider the attribute only moderately descriptive or nondescriptive, and they do not consider the attribute important to their self-image (Markus, 1977).

Being schematic in a particular domain such as exercise behavior, allows a person to filter incoming information about that domain in much the same way that having a schema for perceiving other people guides information processing about them. Being schematic for a given trait means that one is a quick judge of oneself for that trait. If a particular trait is important to a person, he or she will make many judgments about themselves regarding that particular trait in a variety of circumstances, so it is useful to be able to make those judgments rapidly and efficiently (Fiske & Taylor, 1984). People who are self-schematics on a given attribute also notice it in others (Fiske & Taylor, 1984).

Kendzierski's (1994) work on exercise self-schema suggests that such generalized views of oneself may be important determinants of exercise behavior. She described three categories of individuals regarding exercise behavior:

- Exerciser schematics: these individuals describe themselves as being an exerciser and being physically active and 'in shape' and they rate these constructs as important to their own self-image.
- Non-exerciser schematics: these individuals do not consider that descriptors of physical activity apply to them, but still rate these descriptors as important to their self-image.
- Aschematics: these individuals do not consider that descriptors of physical activity apply to them, nor do they rate these descriptors as important to their self-image.

Kendzierski hypothesized that, relative to non-exerciser schematics, exerciser schematics would: (a) endorse as self-descriptive more words and phrases related to exercising and fewer related to not exercising (because of the composition of their self-

image); (b) take less time to make schema-consistent judgments (because having a schema facilitates the processing of schema-congruent information); (c) recall more specific instances of exercise behavior (because having a schema facilitates retrieval of information in the domain); and (d) be more likely to engage in future pro-exercise behavior (because schematics, having reflected more on their behavior in the domain, should be more aware of how they would behave in domain-relevant situations and thus should be more confident in predicting their behavior in such situations).

Applications of Self-schema Theory. Existing self-schemas can manifest themselves in how individuals respond to obstacles and/or lapses in achieving their intentions. In order to act on their intentions, individuals must access those intentions from memory and be motivated to carry them out. Self-schemas serve to moderate the relationship between intentions and behavior. This is because people are motivated to act on their intentions in order to verify their self-image. Also the intentions of schematics should be more accessible than those of aschematics, assuming that behavioral intentions are stored in memory as part of an individual's self-schema (Kendzierski, 1994).

In the context of the transtheoretical model, pre-contemplators and contemplators do not intend to exercise, therefore, exercise self-schema should be low. Individuals in preparation stage may possess higher, but "fragile" exercise self-schemas. If pre-contemplators and contemplators experience changes in their "stage of change", self-schema should increase accordingly. For individuals in the preparation stage, their self-schemas for exercise would likely be strengthened as they progress along the stage of change continuum.

Existing self-schemas can be enlarged when a new connection between general self-representation and another concept is established. All general self-representations are stored together in one distinct self-system that is then linked with other concepts in memory (Markus & Smith, 1981). General self-representations include identifying features of the self, such as one's name, physical appearance, other key aspects of the self such as age, sex, marital status, kinship, and occupational role, and overall evaluations of the self. Repeated associations of the self with other concepts and structures will lead to stronger and more certain connections. Eventually there may be an overlapping of the self and some other concept. This occurs when a large number of representations in a particular structure become self-relevant and when increasingly large numbers of the representations comprising the self-concept are associated with this structure. Once there is an overlapping of the self and another concept, a self-schema may be said to emerge or develop. This structure is now part of the self and is automatically activated when the self-structure is activated (Markus & Smith, 1981). Experience is necessary but not sufficient for the development of a self-schema (Markus, 1977). The individual must also perceive the dimension as self-relevant (Kendzierski, 1994).

Although self-schemas are difficult to change (Greenwald, 1980), positive and negative schemas can be constructed and (re)organized as self-efficacy beliefs of an individual evolve (Kendzierski, 1994). Most people tend to seek information related to the positive aspects of their self (Fiske & Taylor, 1984). As self-efficacy in a particular attribute increases (e.g. physical activity behavior), the attribute will become increasingly self-relevant to the individual, until there is an overlapping of the self and the attribute. A self-schema may be said to emerge or develop at this point (Markus & Smith, 1981).

Negative self-schemas develop when individuals view themselves either as not possessing a desired positive attribute (e.g. the ability to be physically active), or as possessing a negative attribute (e.g. being inactive) (Kendzierski, 1994). Emergence of negative self-schemas plays a role in modifying existing schemas. They are markers of anticipated self-concept change. An individual with a negative self-schema may have developed the schema as a result of thinking about his or her self-image in preparation for doing something to change it (Markus & Wurf, 1987).

Kendzierski (1988, 1994) conducted studies on dieting behavior and exercise behavior of college students. Having an exerciser self-schema may be related to an individual's motivation to devote the time and effort necessary to follow through on one's exercise intentions. To the extent that people consider themselves to be exercisers, they should be motivated to engage in behavior, such as exercise, that will verify their self-conception (Kendzierski & Whitaker, 1997).

Research on exercise self-schemas "could provide a basis for future work involving (a) the identification of individuals most likely to benefit from interventions aimed at promoting exercise behavior and (b) the identification of individuals who may require extra encouragement and/or closer supervision to achieve their exercise goals" (Kendzierski, 1990, p.80). Physical activity interventions could be aimed at (a) developing exerciser self-schemas in those who are aschematic, (b) changing the self-schemas of those who are schematic for not exercising, and (c) maintaining the self-schemas of those who are schematic for exercising regularly (Kendzierski, 1988, p. 55).

## Transtheoretical Model of Behavior Change

Research on the nature of behavior change has suggested that successful behavior change involves movement through a series of stages (stages of change). The transtheoretical model describes the larger framework encompassing the stages of change (Biddle & Mutrie, 2001). Initially, research was conducted to explain how people can quit smoking on their own (Marcus & Forsyth, 2003) but the model can be applied to changing other behavior like physical activity. There are five major psychological constructs in this model: stages of change, self-efficacy, processes of change, decision balance, and temptation (Carron et al., 2003).

The stages of change describe the individuals' level of motivation to change their behavior, from no intention to make the change to making behavioral changes. Beliefs about self-efficacy can play a major role in the process of behavior change from beginning to end. Individuals' perceptions of whether they can successfully perform a behavior increase the likelihood of participation in that behavior (Marcus & Forsyth, 2003). The processes of change describe the "strategies" used by individuals to elicit change. These processes are categorized into five cognitive (e.g. increasing knowledge, increasing healthy opportunities) and five behavioral processes (e.g. enlisting social support, substituting alternatives).

Individuals in a certain stage of motivational readiness can be characterized by the key processes (strategies) in that stage. Decision balance refers to a person's evaluation of the possible gains (benefits) versus the obstacles or losses (costs) that will be experienced as a result of behavior change. People in the later stages of change perceive more benefits of being physically active while people in the earlier stages believe there

are more disadvantages than advantages (Marcus & Forsyth, 2003). Temptation is defined as the "urge to engage in a specific behavior during difficult situation" (Carron et al., 2003, p. 164), and is identified as a strong predictor for relapse occurrence.

Stages of Change

Change occurs in five stages: Pre-contemplation, Contemplation, Preparation, Action, and Maintenance (Maddux, 1995). Each of these stages can be partially defined and differentiated by the role played by self-efficacy beliefs and intention.

1. Pre-contemplation stage. People have no intention of changing because they see no need to change. They have not developed firm beliefs about their self-efficacy for changing and they typically deny having a problem (Carron et al., 2003).

2. Contemplation stage. People are aware of their problems but have not committed to change. People consider the pros and cons of changing (decision balance), including questions about what strategies might be effective (outcome expectancies) and what strategies the person might be able to personally implement (self-efficacy expectancies) (Maddux, 1995). People at this stage are not committed to the change because they are only thinking about it. It is quite possible that they may become chronic contemplators who do not move beyond this information-gathering stage (Carron et al., 2003).

3. Preparation stage. People have taken recent unsuccessful action and strongly intend to take action again in the near future. They are still debating seriously about the potential benefits and harms, but also have made some effort to change. In this stage, beliefs about self-efficacy will be stronger than in the contemplation stage and will be greatly influenced by the individual's interpretations of his or her past change attempts.

People at this stage are also likely to have strong optimistic beliefs about the possible benefits of change (outcome expectancies). Self-efficacy will probably be moderately high, but fairly fragile, because the person has not experienced sufficient success in his or her change attempts (Maddux, 1995).

4. Action stage. People have made a commitment to change and are making deliberate attempts to overcome their problems by changing their behavior, experiences, or environment. People at this stage see themselves as working hard to change. Self-efficacy beliefs will be especially critical during this stage, because people will be monitoring their change attempts and evaluating their successes and failures. Those able to view their attempts in a way that facilitates their sense of efficacy are likely to persist in the face of obstacles and setbacks (Maddux, 1995). Relapse is common in this stage (Carron et al., 2003).

5. Maintenance stage. People work to consolidate and solidify their successes and work to prevent relapse. Their interpretations of these setbacks or relapses can either facilitate or undermine their self-efficacy, which will then determine the strength or their persistence and resilience (Maddux, 1995).

In terms of physical activity, the stages are defined as followed:

1. Not thinking about change (stage 1: pre-contemplation). Individuals in this stage are not physically active. They do not do physical activity and indicate no intention to start in the next six months (Marcus & Forsyth, 2003). There are two types of pre-contemplators. They are differentiated by their reasons for not engaging in physical activity. Pre-contemplation non-believers do not see the value of engaging in physical activity while the pre-contemplation believers do believe in the benefits of physical

activity but cannot start to participate in it (Carron et al., 2003). The type of intervention associated with this stage will be that of information sharing (i.e. benefits of physical activity) (Marcus & Forsyth, 2003).

2. Thinking about change (stage 2: contemplation). Individuals in this stage do not participate in physical activity but intend to start in the next six months (Marcus & Forsyth, 2003). The nature of intervention for individuals in this stage will be that of information sharing, providing encouragement and increasing confidence in participants (Marcus & Forsyth, 2003).

3. Doing some physical activity (stage 3: preparation). Individuals in this stage take part in some physical activity but not at recommended levels (Sallis & Owen, 1999). Individuals in this group may or may not intend to become more physically active (Marcus & Forsyth, 2003). The nature of intervention for individuals in this stage will be similar to that of stage two, in addition to idea sharing (to promote group support) (Marcus & Forsyth, 2003).

4. Doing enough physical activity (stage 4: action). Individuals in this stage meet the recommended amounts of physical activity but are in the beginning stage (less than six months) and they may or may not maintain this level of physical activity (Marcus & Forsyth, 2003). Focus of intervention for individuals in this stage is to identify potential pitfalls and to develop strategies to prevent relapse (Marcus & Forsyth, 2003).

5. Making physical activity a habit (stage 5: maintenance). Individuals in this stage have participated in recommended amounts of physical activity for six months or longer (Marcus & Forsyth, 2003). Focus of intervention for individuals in this stage will be similar to those for stage four.

People do not move through these stages (change) in a linear pattern, but instead "spiral" in and out of these stages as they encounter both success and relapse. Thus, change is upward in direction, but at the same time is circular. Fluctuations in the strength of self-efficacy beliefs may be the major factor that accounts for the movement of an individual in and out of these stages of change (Maddux, 1995). Once a behavior has been maintained for more than five years, the individual is considered to have exited from the cycle of change, referred to as termination (Carron et al., 2003).

Advantages of the Transtheoretical Model

There are three major advantages of using the transtheoretical model to study behavior change (Carron et al., 2003):

1. By dividing the population into the stages of change, interventions can be customized to meet the specific motivational needs of the individuals in each of the stages.

2. By using the stage of change approach, the at-risk population can be divided into pre-contemplation, contemplation, or preparation stages. This serves as an early identification of high-risk individuals (pre-contemplation and contemplation) most in need of physical activity intervention, and allows proactive recruitment by health personnel.

3. The proactive targeting of high-risk individuals combined with a stage-appropriate intervention will lead to higher rate of participation. Marcus and colleagues (2000) state that "one-size-fits-all" programs are not as effective as treatments that target to motivate individuals in different stages.

Research on physical activity that uses the transtheoretical model as a theoretical framework is characterized by combining cognitive models and interventions to promote and enhance a physically active lifestyle that are based on the constructs of the model (Carron et al. 2003). One such study design was carried out by Nigg and Courneya (1998). Their study involved having 819 high school students complete measures of self-efficacy, stages of change, processes of change and decisional balance. Temptation measures were not taken. The results reported the distribution of the sample across the stages of change: with 2.1% in pre-contemplation, 4.2% in contemplation, 28.7% in preparation, 15% in action, and 49.3 % in maintenance. The Nigg and Courneya's study supported the tenets of the transtheoretical model.

## Research on Behavioral Interventions

Interventions are health-promoting activities designed with the intention of instilling or maintaining health-related behavior (Carron et al., 2003). Interventions can be categorized into efficacy trials and effectiveness trials.

Efficacy trials evaluate whether a treatment, procedure, or program provides actual benefits under optimal conditions. Effectiveness trials have the same function but are delivered under "real-world" situations. Whereas effectiveness trials have been conducted in physical activity environments, very few have been published (Caron et al., 2003). The present study was an effectiveness trial.

Three examples of effectiveness trials are outlined in the following interventions, namely Project Active, Project SPARK, and Project Catch. The later two were successful school-based interventions. Despite the differences in the methodology employed in these

studies, they show that matching an intervention to a participant's level of motivational readiness is an effective approach (Marcus & Forsyth, 2003).

Project Active

Project Active is an excellent example of a successful behavioral intervention for adults. The research was designed to demonstrate the long-term outcomes of promoting physical activity using the behavioral approach (Biddle & Mutrie, 2001). Project Active was based on the stages of change model and compared a behavioral counseling protocol, including lifestyle activity (Active Living), with a traditional gym-based program for sedentary but healthy adults (Marcus & Forsyth, 2003). The aim of the intervention was to change sedentary behavior. The group members attended weekly meetings that addressed topics such as goal setting, recruiting social support, and learning how to reinforce their own physical activities (Marcus & Forsyth, 2003).

After the six-month program, both groups showed increased involvement in physical activity. Moreover, 30% of participants were meeting the CDC/ACSM recommendations of participating in at least 30 minutes of moderate-intensity physical activity at least five days a week (Marcus & Forsyth, 2003). In terms of fitness, both groups showed improved cardio-respiratory fitness, reduced total cholesterol, diastolic blood pressure, and percentage body fat after six months. Similar results were obtained after 12 months (Biddle & Mutrie, 2001).

Project SPARK

The Sports, Play and Active Recreation for Kids (SPARK) program was a school-based intervention program that involved primary school children. In this intervention, both classroom teachers and physical education teachers were prepared to teach high

levels of physical activity and movement skills that were enjoyable (Biddle & Mutrie, 2001). Physical education lessons were divided equally between health-related and skill (sport)-related activities. Every week, a 30-minute classroom section would focus on self-monitoring, goal setting, reinforcement, and related behavioral skills (Biddle & Mutrie, 2001). The results showed a significant increase in the amount of time spent in physical activity in physical education classes conducted by physical education teachers and classroom teachers who received special preparation. A follow-up study conducted one and a half years after the intervention showed long-term effects of the intervention on both teachers and students (Sallis & Owen, 1999).

CATCH

The Catch (Child and Adolescent Trial for Cardiovascular Health) program was the largest school-based health promotion study ever conducted (Sallis & Owen, 1999). This two-year program involved the delivery of a heart-health classroom curriculum and family components for Grades 3, 4, and 5 students in 96 elementary schools. The goals of the intervention were to promote children's enjoyment of and participation in moderate-to-vigorous physical activity during physical education classes, as well as to teach children the skills to maintain good eating, physical activity, and smoking habits out of school and throughout life (Biddle & Mutrie, 2001). The results showed that intervention children had higher energy expenditure and greater overall physical activity levels than those in the control schools (Biddle & Mutrie, 2001).

# CHAPTER THREE

# METHODS

## Overview of Study

The goals of this study were to design and implement an intervention that would positively influence the overall amount of physical activity, exercise self-efficacy, and exercise self-schema in adolescent girls in high school. The stages of change model was used to screen pre-contemplators, contemplators, and students in the preparation stage into the study. The study used both qualitative and quantitative methods to analyze participants' change in their self-referent thoughts (i.e. exercise self-efficacy and exercise self-schema). For the quantitative analysis, the study used a pre-test/post-test research design over nine weeks.

The study consisted of three parts: the pre-test (week one), the intervention (weeks one to eight), and the post-test (week nine). As well as physical activity, the intervention focused on enhancing self-efficacy and self-schema for physical activity. It was hypothesized that exercise self-efficacy and exercise self-schema would change as participation in physical activity increased in participants, and that the stage of change would also change as a result. A peripheral purpose of this study was to evaluate the effectiveness of a behavioral program as an alternative to traditional physical education classes.

## The Researcher

In qualitative research, a process termed "bracketing" implies that one takes preconceived ideas, personal biases, and preferences and places them on hold, in abeyance. Bracketing is the suspension of one's various beliefs of the reality of the

natural world in order to better study the essential structures of the world (van Manen, 1990). It sets aside opinions and a priori hunches concerning the phenomenon in question. This is done in order to study the fundamental compositions of the target phenomenon. The following is a personal account which amounts to a bracketing exercise and is the equivalent of objectivity in quantitative research.

The researcher of this study is an immigrant from Hong Kong who has lived in Canada for 22 years. She has 14 years of high school teaching experience in the areas of Science, Biology, Chemistry, and linguistic study (Mandarin). Although the researcher has no formal training in the area of physical education, she has participated in recreational and organized sports throughout her lifetime.

Born as the third of five children in a family in a low-income household, I struggled to find my niche in the family. It seemed that I was too young to be given the freedom and responsibilities my elder siblings had, but was too old to be allowed to enjoy the "carefree" ways of my younger siblings. Most of the time, I just tried to blend in while secretly craving an identity that would be uniquely mine.

It was in the arena of exercise/sport that I found my identity. I was the most active child in the family and this brought me attention from my parents. It seemed to be the only way to be noticed and acknowledged, the only way for me to be validated as an individual. This inadvertently led to my love of physical activity and sports. Competitively, I participated in track and field, swimming, volleyball, and badminton. Recreationally, I enjoyed playing tennis, running, doing aerobics, and just moving around.

I know that I benefited from being active. As a Biology teacher, I often encourage my students to be physically active as much as they can. This is a theme I stress in the "wellness" portion of the curriculum. However, I have noticed that most students are very "unfit" physically. I observe their terrible dietary habits daily and often notice that it is always the same group of students that are doing the main sports (i.e. basketball, volleyball, soccer) in the school. This made me wonder how can young people choose to be inactive despite being bombarded with information on benefits of being physically active. I decided that there must be other factors that influence exercise behavior and the only way to increase physical activity in young people is to learn more about these factors from research. This ultimately led to my interest in conducting this study.

## Recruitment of Participants

To gain approval for the study, formal meetings were conducted between the author and the physical education teachers, as well as the principal, at the high school where the intervention was delivered. Content of the proposal was discussed with the principal and teachers and they granted permission for the researcher to proceed with the intervention. Permission from the superintendent of the school division was also obtained prior to the beginning of the study. Copies of letters of permission are included in Appendix A.

The participants were Senior 2 (grade 10) female high school students enrolled in the last semester (April – June) of the mandatory physical education credit course (0167) at a suburban high school. The intent of the study was to focus on students who were not physically active, so the stage of change questionnaire (Blair et al., 2001) (Appendix B) was used to recruit students from the first three stages. To recruit and screen participants,

it was originally planned that the physical education teacher would meet with all students enrolled in the Physical Education credit course on the first day of class in order to administer the stages of change questionnaire. However, the teacher was absent on that day, so instructions were left for the substitute teacher to administer the questionnaire. The purpose of the study was not disclosed at this time to eliminate bias on the questionnaire.

Seventy-nine questionnaires were collected and, upon inspection, most of them were incorrectly filled out. As a result, the questionnaire was re-administered two days later, when the physical education teacher returned. Once again, 79 copies were received. There were 29 (out of 79) responses from female students and 50 from male students. The researcher went through the sheets and identified the pre-contemplators and contemplators. Only three students were in these two stages. Due to the small number, the researcher decided to include students in the preparation stage as well. This brought the number of potential participants to 11. However, three of them were left out of the program because they were enrolled in academic classes taught by the researcher. This was done to avoid potential conflict of interest.

The eight remaining eligible participants were contacted via the school's daily announcements to meet with the researcher at a time of their choice over the next three school days. Only six of them came for the meeting. In light of the small number of participants screened, they were encouraged to bring a friend who might be interested in participating in the study. The three students who were brought were screened with the Stages of change questionnaire and they also qualified. Interestingly enough, the three "new" recruits were not screened initially because they had missed their physical

education class the day the questionnaire was administered. In the end, nine sedentary female students in the pre-contemplative, contemplative, or preparation stages of motivational readiness were recruited. The stages for each of the nine participants are indicated in Table 1 below.

Table 1

Participants' pre-test results for stages of change questionnaire

| Respondent (pseudonym) | Stage of Change |
|---|---|
| 1 (Mary) | Preparation |
| 2 (Rita) | Contemplation |
| 3 (Tara) | Preparation |
| 4 (Chantal) | Preparation |
| 5 (Lucy) | Preparation |
| 6 (Debby) | Contemplation |
| 7 (Faye) | Contemplation |
| 8 (Grace) | Preparation |
| 9 (Jamie) | Preparation |

The nine students were invited to an information meeting where I explained to them that they were recruited based on the results of the screening questionnaire (stages of change questionnaire). They were also informed of the purpose of the program and the general procedures (i.e. time commitment) of the study. The students were each given the informed consent forms (Appendix C-1) for themselves and their parents (Appendix C-2) to sign and return. I assured the students that the protocol of the study was approved by the Ethics Board from the University of Manitoba (see approval form in Appendix C-3). The screened students were offered a choice of participating in the study, which replaced ten regular classes in their physical education course, or they could choose to continue

with their regular physical education program. Students who participated in the study received "attendance credit" through their participation in the study. Students were officially recruited into the study when they returned both signed consent forms to the researcher.

## Measures

The variables measured before and after the intervention were stages of change, amount of physical activity, exercise self-efficacy, and exercise self-schema.

### Stages of Change Questionnaire

The stages of change questionnaire (Appendix B) is based on the Transtheoretical Model developed by Prochaska and DiClemente (Marcus & Forsyth, 2003). This model focuses on how the motivation to change is reflected in behavior change and identifies five stages of readiness for change: precontemplation (stage 1), contemplation (stage 2), preparation (stage 3), action (stage 4), and maintenance (stage 5). It is important to note that the amount of confidence participants have in their ability to maintain regular physical activity (self-efficacy) is related to the stage they are in. People in the early stages have less belief in their ability than those in later stages (CSEP, 1997).

This instrument was used in two ways: as the recruitment criteria (only those individuals identified in stages 1, 2, or 3 were recruited), and as a baseline and post-test measure. One of the objectives of the intervention was to help the participants advance from their current stage of change (pre-contemplative or contemplative to preparation or action).

As for reliability, studies that have used the stages of change questionnaire found that people tend to get similar scores over a two-week period of time (Marcus & Forsyth,

2003). This provided increased confidence that an individual's intentions and actual behavior were being measured reliably by the questionnaire. Marcus and Forsyth (2003) demonstrated validity when they found that the questionnaire was related to measures of actual physical activity (e.g. number of minutes being physically active).

Amount of Physical Activity

Amount of physical activity was measured using a modified version of the Campbell's Canada Fitness Survey (Appendix D-1) (CFLRI, 1988). This study's version used the same list of physical activities as the original survey. However, instead of surveying for participation in activity over the last 12 months, it asked participants to recall their physical activity (frequency and duration) over a one-month period. This made it easier for the participants to recall but was still representative of a reasonable period of time. The modified survey did not ask the participants to indicate the intensity of their participation in physical activity because of its subjectivity. One participant's idea of mild/moderate/vigorous activity could vary greatly from the next participant's perception. The total amount of physical activity was calculated by multiplying the frequency and duration of each physical activity and then adding the activities. The total monthly score (minutes) was divided by four to get the average weekly physical activity time.

Folsom, Caspersen, Taylor, Jacobs, Leupker, Gomez-Marin, et al., (1985) reported the reliability of the Canada Fitness Survey at 0.86 ($p<0.05$) for moderate physical activity. Leon, Connett, Jacobs, & Rauramaa (1987) reported the internal validity of the survey at 0.41 ($p<0.05$).

Exercise Self-Efficacy Scale

The exercise self-efficacy scale (Appendix D-2) used in this study was developed by Shin, Jang, & Pender (2001). This self-efficacy scale was tailored to the domain of exercise behavior and assesses the factors that regulate/influence participants' self-perceived ability to perform their exercise routine regularly (three or more times a week).

The exercise self-efficacy scale measured levels of task demands that represent gradations of challenges (Bandura, 1995). It reflected the level of difficulty individuals believed they could surmount. In this scale, individuals judged how well they could get themselves to exercise (moderately) regularly in spite of various barriers, such as when they were under pressure from work (school), were tired or depressed, in poor weather, or when they had other commitments or more interesting things to do (Bandura, 1995). Shin and colleagues (2001) categorized the items in the self-efficacy scale into three sub-factors: situational/interpersonal, competing demands, and internal feelings.

Participants were presented with items portraying different levels of task demands and rated the strength of their belief in their ability to carry out the requisite activities at the present time. Participants recorded the strength of their efficacy beliefs on a 100-point scale, ranging in 10-unit intervals from 0 (cannot do), to 50 (moderately certain can do), to 100 (certain can do). The mean score for the items in each sub-factor was calculated.

Shin and colleagues (2001) used a 100-point scale because they believed people usually avoid the extreme positions on a scale; a scale with a narrow range (i.e. 1 to 10) may be reduced to an even narrower range. This could result in the loss of differentiating information since people who choose the same response may not have done so if intermediate steps were available (Bandura, 1995).

Renner and Schwarzer (2003) reported that the reliability for the exercise self-efficacy scale was high (alpha = 0.88). They also reported the correlation with behavioral intention (physical exercise and health lifestyle) at r = 0.327 and r = 0.209 respectively. Both were significant at the 0.01 level (2-tailed).

Exercise Self-schema Measure

The exercise self-schema measure (Appendix D-3) was developed by Kendzierski (1988) to identify exerciser schematics, aschematics, and non-exerciser schematics. It required the participants to indicate on an 11-point scale whether or not each of three key phrases described them: "someone who exercises regularly," "someone who keeps in shape," and "someone who is physically active." These phrases were included among a set of filler items such as "spontaneous" and "friendly." Each scale ranged from 1 (does not describe me) to 11 (describes me). Participants were also asked to indicate on an 11-point scale (for which 1 = not at all important and 11 = very important) how important each descriptor phrase was "to the image you have of yourself, regardless of whether or not the trait describes you" (Kendzierski, 1994).

The participant was classified as an exerciser schematic if she rated at least two of the three exercise descriptors as extremely self-descriptive (points 8 – 11) and if she rated at least two of the three exercise descriptors as attributes that were extremely important (points 8 – 11) to her self-image. The participant was classified as a non-exerciser schematic if she rated at least two of the three exercise descriptors as extremely non-descriptive (points 1-4) and rated at least two of the three exercise descriptors as attributes that were extremely important (points 8-11) to her self-image. The participant was classified as aschematic if she rated at least two of the three exercise descriptors in

the middle range (points 5 – 7) and rated at least two of the three exercise descriptors as attributes that were not extremely important (points 1 – 7) to her self-image (Kendzierski, 1994).

The results of Kendzierski's (1990) study suggested that exerciser and non-exerciser schematics processed information relevant to those domains (exercise-related information) in the same way as individuals who are schematic in other domains. These findings provide evidence of the exercise self-schema measure's construct validity (Kendzierski, 1994).

## Intervention

### Overview

The eight intervention sessions took place outside of the participants' regular physical education class but were comparable in length to a normal class (65 minutes). In other words, the participants were "excused" from their regular physical education classes on the days (Fridays) of the weekly meetings. Instead, they attended the intervention sessions at lunch hour to accommodate both the researcher's teaching schedule and the participants' academic schedules since they were recruited from different physical education classes.

The lunch hour was the only "common" time we had to meet as a group. Each of the eight sessions began in a regular classroom where attendance was taken and brainstorming, sharing, and discussion took place. The researcher and the participants took part in some type of moderate physical activity during each session (i.e. a 15 minute walk outside). When the weather was unsuitable for outdoor activities, the participants

and researcher proceeded to the indoor track located in the basement of the school. All sessions finished with setting behavioral goal(s) for the up-coming week.

Designing the Intervention

Several literature sources provided the guidelines and ideas for the design of the intervention used in this study. Two major sources of influence were Blair and colleagues (2001), book "Active Living Everyday" and Marcus and Forsyth's (2003) text "Motivating People To Be Physically Active". Both books focused on influencing behavior through goal setting and self-reinforcement. Many work sheets used in this intervention were adapted from the above sources, as well as the Canadian Physical Activity, Fitness and Lifestyle Appraisal produced by The Canadian Society for Exercise Physiology (CSEP, 1997). The work of Kendzierski (1994, 1988) was also considered.

Biddle and Mutrie's (2001) book "Psychology of Physical Activity" identified several major determinants of physical activity and described the benefits of group settings in designing interventions to influence these determinants. A group setting is a more cost-effective way to reach a large number of participants, such as in a school setting. The success of group interventions is related to the ability of the facilitator to create an open and safe environment for sharing to occur.

Implementation

The weekly meetings focused on identifying the students' readiness to change their physical activity behavior, their exercise self-efficacy, and their perceived barrier(s) to physical activity. Another part of the intervention focused on problem solving (i.e. helping participants to overcome barriers to physical activity) and behavioral skills such as goal setting and relapse prevention. Detailed logs of physical activity were not a major

part of the study because they were considered a barrier due to the high school students' other commitments, homework, jobs, family responsibilities, etc.

The last of eight sessions was a wrap-up session where participants shared the insights they had gained from the program and their expectations for their future involvement in physical activity. This evaluation formed part of the qualitative assessment of the intervention.

Attendance was taken at the beginning of each session (copy in Appendix E) followed by a "sharing" time among the participants regarding their physical activity experiences of the previous week. This included what goal(s) was set and whether the goal(s) was achieved. Goal setting and self-monitoring are important parts of self-assessment. Martin (2003) stated that setting public goals provides a public standard against which the performance can be evaluated, and may carry social consequences of achieving or not achieving the goals. As a result, public goals tend to be more effective than private goals. Martin (2003) also pointed out that goal setting plus feedback is more effective than goal setting alone.

Outline of Intervention

The following is a brief outline of the eight intervention sessions:

Session 1: Raising Awareness. The intent of the first session was to learn about the participants' motivation and barriers (if any) to participate in physical activity. This session began with a brief introduction of the researcher's background and experiences in physical activity. There were only six participants at this point of the study as the other three were recruited later. The researcher distributed the three quantitative measures (physical activity questionnaire, exercise self-efficacy measure, and exercise self-schema

measure), and the participants completed them one at a time. This took almost 20 minutes to complete. Originally, the measures were supposed to be distributed for completion by the students during a separate pre-test session. Due to a delay in obtaining Ethics Board approval and in administrating the screening (stage of change) questionnaire, this step was merged into Session 1 to make it possible to complete the intervention before the final examination period in June.

A 15-minute discussion of how the participants viewed physical activity followed. The researcher recorded the responses to the following questions from the participants. These questions were asked in order to form a baseline to enable comparison of how/if their personal perceptions changed over the course of the intervention.

1. When you think of being physically active, what word(s) come to your mind?
2. What words would you use to describe yourself (e.g. musician, athlete, etc.)?

After the discussion, the benefits of physical activity were introduced with the use of an overhead transparency. This information was important for both pre-contemplators and contemplators so that they became aware of and learned to appreciate the benefits of physical activity.

In order to gauge initial feelings/attitude toward their traditional physical education program, the participants were asked to brainstorm, for about ten minutes, factors that caused them to like or dislike their physical education classes.

The group went for a ten-minute walk at the school's indoor track. At the end of the session (after returning from the walk), participants set their own activity goal(s) for the coming week. Participants completed the weekly activity goals sheet (Appendix F-1) to help them keep track of their goals. It was pointed out to the students that there were

two sections to the weekly activity goal sheet. The first section was used for goal setting and the second section was use for self-monitoring.

Three students joined the study this week. I scheduled a meeting with them prior to the next session for them to complete the pre-test measures and for me to have a chance to ask them some of the same questions that I asked the "original" group earlier in the week.

Session 2: Looking at Past Experiences. The purpose of this session was to start focusing on self-efficacy and how the participants felt about their own behavior related to physical activity. Participants began this session sharing their exercise experience from the past week by answering the following questions:

1. Did you achieve the goal you set last week?
2. How did you achieve your goal?
3. Did anything make it difficult to adhere to what you set out to do?
4. How did you feel when you were doing the physical activity?
    a) What did you like about the physical activity?
    b) What did you not like about the physical activity?

After the initial discussion, the participants completed the questions on the physical activity history worksheet (Appendix F-2) as a group with the researcher guiding the discussion. The purpose of using these questions was to help the researcher to explore any "incidents" in the participants' past that might have caused them to reject physical activity as part of their lifestyle. Participants were also asked to share their past experiences in changing lifestyle habits. The discussion focused on the fact that they were capable of changing habits and the task at hand was to concentrate on the strategy(ies)

that worked in the past. Past behavior of changing behavior is the single strongest predictor of future changing behavior (Marcus & Forsyth, 2003). Recalling successful experiences was used to enhance the barrier efficacy of the participants so that they became more confident in their ability to overcome barriers to physical activity. This session was important for pre-contemplators and contemplators, as they needed to be exposed to strategies (old and new) for eliciting change in their behavior.

After the discussion, the group headed to the basement for a 15-minute walk. Participants set their goals for the upcoming week at the end of this session by completing the activity goals sheet.

Session 3: Finding Motivation. This session introduced some strategies to increase physical activity and encouraged participants to explore the motivating forces behind their participation in physical activity. It began with a sharing time where participants talked about their experience of attempting to achieve their activity goals. This sharing time exposed participants to a variety of activities. Goals play an important part in the development of self-efficacy (McAuley, 1992). Goal attainment provides mastery information that serves to enhance self-efficacy. Observing other participants achieving their goals can also be a source of vicarious experience (observational learning), which can increase self-efficacy. The inventory of lifestyle needs and activity preferences (CSEP, 1997) (Appendix F-3) was administered to help the participants understand what type of activity would best match their lifestyle needs and preferences, and thus, motivate them to become physically active.

The group went for a 15-minute walk outdoors. Goal setting for next week took place after the group finished the activity.

Session 4: Enjoyment/Finding Rewards. This session began with the sharing of exercise experience during the previous week. The participants were asked to explore what activities they enjoyed and felt competent in. Studies have shown that people typically enjoy doing what they are good at - perceived competence (Maddux, 1995). It follows that participants will have a better chance of achieving the task they have chosen. This was another opportunity to provide mastery experience. The Enjoyment worksheet (Project GRAD, 1999) (Appendix F-4), allowed participants to identify what types of activities they enjoyed and how they could better motivate themselves to increase the amount of time spent on these activities. Participants were asked to fill out the enjoyment worksheet for a low intensity (i.e. walking, gardening), a moderate intensity (i.e. bicycling), and a high intensity physical activity (i.e. running). We also worked on developing positive self-talk (sort of a motto) that would encourage the participants to stick to their goal(s).

The second purpose of this session was to get participants to identify rewards that could motivate them to become physically active. To achieve this, the participants brainstormed about the kinds of rewards that kept them motivated to stay the course of becoming physically active. Participants were given the goals and rewards worksheet (Blair et al., 2001) (Appendix F-5). Whereas the intrinsic rewards of improved health and confidence level may take some time to achieve, extrinsic rewards could be a way to maintain / boost motivation (Blair et al., 2001) in the short term.

The group split up and three participants went outdoors for a 15-minute jog and the other six stayed together for a 15-minute walk. Activity goals for the next week were set at the end of the session.

Session 5: Strategies for Relapse Prevention. The purpose of this session was to identify some of the reasons that cause people to relapse in terms of being physically active. A relapse is an extended period of time with no physical activity (Marcus and Forsyth, 2003). This session began with sharing of activity experiences of the previous week. A discussion on relapse and relapse prevention strategies took place. Discussion focused on the fact that relapse does occur, but it does not necessarily mean that all benefits will be lost and that there is no hope of reaching the exercise goal(s) that have been set. When participants learn that they could use the behavioral skills they had acquired to overcome the tendency to be inactive, their self-efficacy would increase (Marcus and Forsyth, 2003). This enhanced self-efficacy would help the participants to deal with relapse when it occurred and to move forward after the relapse. The participants were made aware of what a relapse was and how to anticipate it, as opposed to avoiding relapse at all cost, which is highly impractical and unrealistic.

The relapse planner (CSEP, 1997) and activity alert (Blair et al., 2001) (Appendix F-6 and F-7) were used to guide the discussion and help participants consider some of the obstacles to success. Participants assessed how confident they felt about maintaining what they had accomplished and developed strategies for "high-risk" situations.

After the discussion, the group headed outdoors for some physical activities for 20 minutes. Eight of them chose to walk. One chose to play "foot bag" with her friends who were not part of the study. At the end of this session, exercise goals were set for the week.

Session 6: Progress Check. The purpose of this session was for participants to evaluate their own progress so far. The session began with a discussion of the

participants' progress so far. Participants were asked to complete a 10-minute journal where they wrote down thoughts they had regarding their progress and their perception of the intervention. By providing feedback on the progress check, the researcher helped participants make sense of the changes (or lack thereof) that were taking place and helped them to maintain a positive outlook about the results. The participants' responses were collected and shared amongst the group. The group went outside for a 20-minute walk and returned to set activity goals for the upcoming week.

Session 7: Exploring other Options. This session began with sharing of participants' activity goals (what they set out to accomplish) and self-monitoring outcomes (what they accomplished) over the previous week. The participants brainstormed activities they could do at home that could be considered moderate physical activity. This was important because the Winnipeg winter can be un-inviting for outdoor activities. On days/weeks when outdoor weather is not good, participants needed to have some ideas of what they could do to maintain their activity goals. Participants were also asked to explore the resources/opportunities for physical activities that were in their community. The group completed the "Opportunities for Physical Activity in my Community" worksheet (Appendix F-8) together. This served to expand the repertoire of physical activities for the participants and made them aware of how readily available these opportunities were to them. After the sharing time, a discussion took place regarding choices of indoor activities that they could do at home when they cannot go outside.

The group proceeded to the outdoors and walked/power-walked for 20 minutes. This session ended with setting activity goals for the upcoming week.

Session 8: Goal Setting for the Future. The purpose of the last session was to assess what perceived benefits (if any) the participants got from participating in this program, especially how it changed their beliefs about being able to be physically active and their thinking about themselves as an active person. This also served as a goal setting session where participants described their goals for the future. Setting new and challenging goals was important because boredom and a loss of focus can become a real danger for relapse to occur (Carron, et al., 2003).

This session began with sharing and participants were asked to respond to the following open-ended questions on paper.

1. What have you gained by participating in this study?
2. What is/are the biggest change(s) that has/have taken place for you?
3. Do you feel any differently about participating in physical activities? How so?
4. What other support do you need to help maintain the progress that you have made?
5. What was the most useful information you received from this program?
6. How confident do you feel about continuing to be physically active after the completion of this intervention?
7. Are you glad you agreed to participate in the intervention or do you wish you had stayed in your regular physical education class?
8. What words would you use to describe yourself?

The researcher collected the participants' written responses. After the discussion, the participants were given a Contract of behavior change (Appendix F-9). The purpose

of this "contract" was to provide the participants with an opportunity to establish a formal goal after they left the program, and to determine factors that would help them succeed. Participants were encouraged to refer to this contract from time to time to reconfirm their commitment to be more physically active (CSEP, 1997).

Post-Test

The post-test meetings with the participants were scheduled both individually and in small groups. This was done to minimize disruption to the participants' exam preparation routines. The participants were asked to meet with the researcher for the post-test immediately following their last exam of the school year in June. During the post-test session, the participants were asked to again complete the stages of change questionnaire, the physical activity questionnaire, the exercise self-efficacy scale, and the exercise self-schema measure. This enabled changes in amount of physical activity, stage of change, exercise self-efficacy, and exercise self-schema to be measured.

Qualitative post-test evaluation included the researcher's field notes from close observations of participants' behavior and responses throughout the intervention, various forms of interviews, interactions with the participants, and their written responses to the questions asked during Session 8 of the intervention. The researcher's reflections and impressions were also part of the qualitative analysis.

## Qualitative Methodology and This Study

Space constraints make it impossible to convey a complete definition of qualitative methodology, however what follows represents aspects of qualitative research that have relevance to the qualitative features of this study. The brief definition and overview may be helpful to readers unfamiliar with qualitative methodology.

Qualitative Research Defined

In brief, qualitative research provides information not obtained through statistical procedures or other quantitative means. While quantitative research seeks information on cause and effect, prediction, and generalization, qualitative methods attempt to understand some phenomenon or some thing. While quantitative research requires objectivity, qualitative research seeks subjectivity. Multiple methods of inquiry might be used to collect information in an attempt to understand the meaning of a social phenomenon (Denzin and Lincoln, 1994).

Qualitative research is rooted in empiricism and existentialism, or the recognition that human existence has some meaning at an individual level of analysis. It assumes humans can be studied from the inside, in terms of their lived experience using an interpretative approach.

Qualitative research involves collecting descriptions or narratives of events as contrasted to gathering numerical data. Phenomena are studied in natural settings in context. The interviewer is the qualitative research instrument and integral to the investigation. Qualitative studies are often conducted in collaboration with the participants who are viewed as co-investigators with a shared responsibility for studying the phenomenon of interest.

Typically the investigator poses questions and then probes and explores responses to identify and define thoughts and feelings about the topic being studied. In-depth, often semi-structured interviews are conducted with a small number of individuals until the researcher has come to a sense of understanding, of knowing the nature, meaning, or

essence of a phenomenon. At this point, responses resonate and there is a sense of saturation, of having heard the accounts already.

Qualitative research, when done properly, is rigorous research with explicit sampling strategies, systematic data analysis, and openness to examining counter explanations. Validity, objectivity and reliability are replaced by concepts such as trustworthiness.

Trustworthiness and triangulation. Qualitative inquiries are oriented toward the interpretation and production of reconstructed understandings, which contribute to what is termed trustworthiness. The credibility aspect of trustworthiness speaks to the capability of the researcher (Denzin and Lincoln, 1994). As the investigator, based in part on my description of myself as researcher previously in Chapter Three, I felt competent and qualified to conduct the qualitative portion of this study.

Triangulation is a way of employing various perspectives to affirm the method, data collection, analysis, and interpretation. It can be accomplished in a variety of ways using a variety of sources, different interpreters, various perspectives to interpret information, and multiple methods to study a single problem to inform the research process and broaden its understanding (Denzin & Lincoln, 1994). This provided an increasingly deeper understanding of the target question. The study participants and my supervisory committee all contributed to triangulation by providing comments.

The data were triangulated and authenticated through various techniques. For example, member checking is a process where participants are probed to clarify and confirm their accounts, offers an opportunity to corroborate or amend information. The participants also provided descriptions of their lived-experiences. Finally as a process of

collaborative analysis (van Manen, 1990), committee members reviewed the study protocol and findings and commented on its believability.

Qualitative Protocol in this Study

This study utilized a collective case study focus group approach combined with an instructional component and a phenomenological orientation (Stake, as cited in Denzin and Lincoln, 1994). Qualitative research does not typically employ multiple methodologies, however due to the structure of this study, the methods utilized seemed appropriate.

Case study qualitative research may be defined by a particular topic of interest, one that draws the researcher(s) and participants into providing insight into a target phenomenon. The case may be simple or complex, involving single or multiple participants. Because of the instruction, the study may also be referred to as a teaching case study (Kennedy, as cited in Denzin and Lincoln, 1994).

During the intervention, certain phenomenological aspects or features of the case were selected for further study, namely, the interactions, thoughts, feelings, and meanings assigned by a group of high school female students participating in a physical activity intervention. Through a logical and systematic collection of information, the researcher and reader gain a sense of the target phenomenon and an improved understanding is achieved. Since it is acknowledged that case studies are not a good representation, as is the situation with most qualitative research, because their purpose was not to attempt "to represent the world" (as cited in Denzin & Lincoln, 1994, p. 245), but instead, to simply represent the phenomenon in context. The reader is left with his or her own interpretation.

Focus group interviewing, initially developed as part of market research, is generally comprised of from seven to ten people who are selected because they share some common characteristic or experience. The facilitator encourages discussions and the expression of opinion. The interaction among the participants is the essential element of this type of interview technique (Rossman & Rallis, 2003).

While this study is not strictly phenomenology, there is a phenomenological interest in this study, based in part on the work of van Manen (1990), who has described a systematic method of studying the experience of phenomena. Van Manen's method evolved from that of Merleau-Ponty, Heidegger, and Gadamer and the work of early and mid-twentieth century European educational theorists.

Hermeneutic phenomenology begins with a sense of wondering about what some thing or some phenomenon or experience is like. The question may be simple, however, phenomenological inquiry is not uncomplicated, nor is the answer necessarily simplistic. Hermeneutic phenomenology attempts to both describe and explain an experience. Phenomenology, as a descriptive human science, is attentive to how things appear and how they are revealed. Hermeneutics is interpretative in that it assumes that most, if not all things, have meaning and can be understood and expressed through the medium of language and writing. This type of research can also be described an existential to the extent that it attempts to describe how phenomena present themselves in lived experience, in human existence (van Manen, 1990). Phenomenology became hermeneutical when it argued that every form of human awareness is interpretive and when humans were recognized as being able to take on a central role in interpretation.

Thematic analysis. The literature on analysis and interpretation of qualitative data has a least four common assumptions. Firstly, data collection, analysis and interpretation proceed simultaneously. Secondly, a systematic method for analyzing the interviews is required to reduce the data into thematic units. Thirdly, meaning is drawn from patterns of relationships within the thematic units. Finally, a method is required to verify the accuracy of the analysis and interpretations to avoid inconsistencies or contradictions (van Manen, 1990).

A theme is a recurrent dominant idea common to the content of a narrative. It is what something is about, a focus of meaning, the showing of the point, or notion, the living sense of an experience. It is a tool for deriving the meaning of an experience by giving structure to something through defining its essence. Themes are found in various forms, in conversations, stories, notes, diaries, passing comments, and in reflections, all parts of this study.

Van Manen's (1990) approach toward uncovering or isolating themes views each statement and attempts to reveal meaning contained within phases, sentences, and paragraphs from interactions and conversations. In order to capture themes, one identifies phrases that represent the main thrust of the meaning. Then one asks what each sentence or sentence cluster seems to reveal about the nature of the phenomenon or experience. The writing and discussion of themes, along with the reading and other research activities is the hermeneutic process.

In addition to identifying themes and checking with participants for input, committee members reviewed the study protocol, the data, thematic analysis, and commented on its believability. As mentioned, this collaborative analysis, as another

triangulation point, examined and re-interpreted the themes and reformulated them to generate deeper insight.

## Qualitative Data Analysis

The researcher interpreted the participants' experiences with the intervention through the triangulation of several data sources.

### Data from Participants

These included flip charts from brainstorming activity, field notes taken during and after each session, notes from what was said during group discussions, as well as responses (work sheets) from the participants.

### Data from Researcher

These included field notes from participants' activities, behavior, and comments made during each session. Additional information included observations and reflections by the researcher recorded after each intervention.

The field notes were written down at the end of each school day after the intervention sessions took place. This was done to accommodate the teaching schedule of the researcher. The researcher was scheduled to teach two sections right after lunch and therefore had no time to write the field notes until after school.

By examining all the data, frequencies (of particular responses) and "emerging themes" were identified from the qualitative sources listed. The researcher interpreted the participants' responses from the impressions (i.e. personality) that the researcher formed based on various forms of interactions with the participants.

## Quantitative Data Analysis

The quantitative part of the study used a repeated-measures research design, where a group of individuals was tested twice, before and after the intervention, in each of the variables: amount of time spent in physical activity, exercise self-efficacy, exercise self-schema, and the stage of change.

Descriptive statistics (means, standard deviations) were calculated for all variables except stage of change and exercise self-schema. Both are nominal variable so only frequencies were calculated (i.e. the number in the pre-contemplation, contemplation and preparation stages at the beginning of the intervention and at the end).

The pretest and posttest scores for the exercise self-efficacy scales and amount of participation in physical activity were analyzed using repeated measures analysis of variance. Because of the small number of respondents, calculations were done manually by the researcher without the use of statistical software. Calculations of F scores are included in Appendix J.

Categorical data included the descriptions for stages of change and exercise self-schema.

# CHAPTER FOUR
# RESULTS

The results of this study will be presented both qualitatively and quantitatively. The qualitative results will include narrative and reflective description from the participants and the researcher, the presentation of quantitative results of the pre-test and post-test scores for the four measures used, the Stages of Change questionnaire, the physical activity questionnaire, exercise self-efficacy scale, and the exercise self-schema measure.

## Qualitative Data

Over the course of nine weeks, starting in April of 2005, the researcher and the participants met ten times while the intervention program took place. Nine out of the ten meetings were group meetings while the tenth meeting was the post-test, which was held during the school's exam period in June with each participant taking part after they had written their last school exam. The first part of this chapter will be a summary of the participants' experiences throughout the intervention as well as the researcher's observations of how the intervention unfolded. Some of the students' written reflections and responses to questions are also included.

### Initial Meeting

When I first met the students, all of them appeared to be very shy (not wanting to say too much) and unsure of what I was about (i.e. my motives, personality, etc.). This was mainly because they had never met me before, and perhaps my reputation as a "tough" Science teacher preceded me. After I outlined the goals of the study to them, some seemed slightly interested while most remained neutral. However, two of the participants were somewhat "surprised" that they were "targeted". I tried to defuse any

"tension" by explaining that it was not possible to "target" particular students since I did not know them at all, and that they were recruited solely as a result of the screening questionnaire (Stages of change). I did not try to persuade them to join or not join the study. To my surprise, all six returned their consent forms within three days. I was also pleased to see that five of the participants expressed interest in obtaining a summary of the study. I felt that might increase the chances that they would take the intervention seriously, as I obviously did. The two participants who were "surprised" were particularly delighted when they were told they could bring a friend.

Description of Participants

This section will include a brief description of each of the nine participants. The description includes their physical characteristics and their personality as observed and recorded by the researcher. Actual names of students were replaced with pseudonyms for the rest of the thesis.

Mary: preparation stage, non-exerciser schematic, below average height, slightly overweight, very positive and a hard worker, took the intervention very seriously

Rita: contemplator, non-exerciser schematic, visiting International student form China, English-as-second language (ESL) student, very quiet, and had a hard time understanding the spoken and written instructions, below average height, inactive

Tara: preparation stage, exerciser schematic, very outspoken and outgoing, friendly, high energy, loved to move, average height, very fit and active already – may have been recruited by mistake

Chantal: preparation stage, non-exerciser schematic, out going, friendly, average height, tried to figure out what the researcher was trying to do, insightful

Lucy: preparation stage, aschematic, very friendly, quiet, average height, tried everything during the intervention

Debby: contemplator, aschematic, tall, inactive, new immigrant from China, ESL, very sociable

Faye: contemplator, exercise schematic, tall, very thin, very inactive, liked to think of herself as active, tended to over-exaggerate amount of physical activity, missed two sessions of intervention

Grace: preparation stage, non-exerciser schematic, average height, very thin – almost frail, outgoing, friendly, took the intervention seriously

Jamie: preparation stage, exerciser schematic, friendly, smart, average height, seemed to be in good health, honest with sharing, had a sense of humour

## Comments on Intervention Sessions

### Session 1: Raising Awareness

In order to gauge how the participants viewed the whole idea of physical activity, I asked them what word(s) they associated with being physically active. They used words like "hard work", "sweat", "busy", "games", "phys-ed", and "lazy". When asked what word(s) they would use to describe themselves, the participants answered with general descriptors of personality types, i.e. friendly, fun-loving, and quiet. Mostly, they just smiled at me and remained quiet. I was glad to see that the terms they came up with to describe themselves were generally positive ones. At this point, the participants seemed a bit nervous, as was I. They were not particularly vocal about their thoughts. We spent almost 15 minutes covering just these two questions! I had originally planned to ask them

move these two important questions to the next session.

Students were given a handout on the benefits of being active and the Canadian guidelines for increasing physical activity, both of which were discussed. I became aware of a potential communication problem with Rita, as she was using an electronic translator during the completion of the pre-test measures and discussion period. She also seemed a little bit scared of me. I tried to make a lot of eye contact and smiled reassuringly at her. That seemed to work as she actually returned my smile once toward the end of the group discussion.

As I began to discuss the general benefits of being physically active and the Canada Physical Activity Guide with them (handout), the students were becoming more and more passive by the minute, which was not the tone I wanted to set for the intervention. I had visualized the participants of the study being engaged and enthused in the discussion, so this was a surprise to me and I had to make some quick adjustments to the schedule right away. I stopped my discussion after about ten minutes (as compared to fifteen minutes as planned) and informed the students that we were going for a walk on the school's indoor track for ten minutes. The participants seemed surprised, partially because they did not even know that there was an indoor track at the school. That was surprising to me considering that they had been at the school for almost a year.

The two Asian girls (Rita and Debby) walked with me, and three girls walked ahead as another group. Faye decided to walk on her own. They were all very surprised when I informed them that six minutes had passed. At this point, I noticed that Faye had "disappeared". When asked about this after the walk, she said that she simply had to go to

about what motivates them, or stops them, from being physically active, but decided to

the bathroom. This was the first incident in an ongoing pattern of behavior for this particular participant. Another interesting observation was that Rita and Debby, both ESL students, chose to walk with me. I wondered if the fact that I am also Asian had something to do with it. They seemed to be comfortable around me and I was glad about that.

Overall, the participants were pleasantly surprised that ten minutes passed so "easily". The final activity we did in this session was to distribute the weekly goal sheet (Appendix F-1). The activity goals that the participants set included "dancing", "walking", "running", "playing soccer", "swimming", "bicycling", "skating", and "doing sit-ups and push-ups". They were very ambitious goals and all participants were intent on meeting their activity goals immediately. I did not try to dissuade them at this point, even though I felt the goals they were setting were unrealistic. I chose the approach where the participants would discover for themselves that they needed to set realistic goals. I also felt that this would make a good conversation starter for our second session the following week.

I was encouraged by verbal responses such as "…oh, ten minutes is not that hard…", and the fact that three of them said that they knew of someone who might be interested in participating in the study. Much of the focus of this session, on my part, was to establish a good relationship with the participants. In my "regular" role as a Science teacher at the school, being able to connect with my students was definitely one of my strengths. I knew, from the outset, that I would be relying on this strength to maintain the participants' interest, motivation, and attendance for the duration of this intervention.

Session 2: Looking at Past Experiences

This session began by checking the goals set the previous week. Only one participant (Grace) out of the nine managed to meet the goals set. It was immediately clear to the participants that the goals they had set were overly ambitious and not realistic. In fact, Rita did not attempt the goal set at all. A sample goal sheet is included in Appendix G-1. Looking at the goal sheet, it can be seen that Tara did not complete it properly. First of all, there was an overlap for soccer and running - they were the same activity but were set as separate goals. Secondly, she indicated the "when" of participation as "whatever day of this week" which was incorrect. She was asked to state exactly what day of the week the activity would take place. In terms of goal attainment, she had planned to walk everyday from Monday to Friday, but according to the self-monitoring, only did so on two occasions. This was an example where the goal setting skills were undeveloped, the environment where the activity was to take place was not specified. Also, the goals were unrealistic and the student did not come close to achieving the goals. Later on, the participants indicated that this was one of the most valuable lessons they learned from the intervention.

During the discussion part of the session, I asked the group what made them want to be physically active, they responded with "body image concerns", "it's for our own good", and "it is fun sometimes". Of the three categories of motivation suggested, "body image concerns" (as in being too "fat") received the most votes. This was surprising to me since I would only consider that one student (Mary) was slightly overweight, and that two other participants (Faye and Grace) were "frail" looking. I also became very reluctant and cautious to comment on how the participants looked at this point since I was

concerned that this might trigger the onset of eating disorders (i.e. anorexia nervosa and bulimia) in the participants. I was particularly sensitive about this because of my own experience of trying to lose weight through starving my body and over exercising. In retrospect, I probably could have probed them more on this topic but I simply became too tentative about the possible repercussions and did not pursue the subject as much as I should have.

When asked what made them not want to be physically active, "laziness", "other priorities", "lack of time", and "it had to be a sport" were the answers. It was significant that "laziness" was the first "choice" by the students and that there was actually a pause right after they suggested being lazy was the main reason for their "inactivity". From watching how quickly the answer was tossed out and how they just stopped, it looked to me that students thought being lazy was the easiest reason they could think of that would explain their behavior in regard to physical activity. They could be described as being "hopeful" that I would be satisfied with their answer and stop my prompting/questioning. I was not going to let them off the hook that easily, so I persisted with my questioning and students then came up with other responses. I found the "it had to be a sport" comment interesting in the sense that I did not realize that students generally associate being physically active with playing a sport such as basketball, volleyball, etc. At this time, some students felt that the only way that they could become physically active was to participate in "sport". The students were surprised when I told them that vacuuming the house is considered a physical activity. An insightful comment came from one of the participants at this point: "maybe I am more physically active than I had previously thought." They also indicated that they enjoyed the instances when they did activities that

were more "game"-like (i.e. obstacle course) in their physical education classes. They were given a handout titled "Getting started" which outline thirteen ways to incorporated moderate physical activity into their daily routines.

At this point, I wanted to find out how they felt about their "regular" physical education classes, so we brainstormed two lists of reasons for liking and disliking these classes. The reasons for liking their regular physical education classes were as follows:

- We get to be active.
- We like to play games.
- It beats sitting in the classroom.
- It is fun.
- Marks are not based on ability, but on how much you try.
- It is a safe environment; the teacher is capable of performing the skills herself, so she can really help us and make sure we don't do anything to hurt ourselves.

The reasons for disliking physical education classes were as follows:

- It is boring – you play the same "sport" for a long time (~ 1.5 weeks).
- It is tiring.
- You are "forced" to do what you are not good at.
- Not being able to choose what you want to do.
- An un-supportive environment in the sense that at times, students are put on the spot one by one to perform a skill.
- Lack of music.

It seemed to me that students were looking for two types of "safety" in their class environment – physical safety (free from bodily harm) and emotional safety (free from

embarrassments). From their comments, one could see that students were able to find physical safety, but not emotional safety, in their physical education classes.

I found the process of coming up with this list very interesting. When I asked what they thought was positive about the physical education classes, the participants were very eager to come up with items for the list. However, when it was time to list the negatives, there was actually no response to begin with. It wasn't until I indicated that they must enjoy their physical education classes and that their classes should continue to be run the way they have been, that they began to identify what they did not like. I wondered if this was really about trust, and that perhaps they did not trust me enough yet to openly discuss the "short-comings" of a course in the school. I also wondered if we would overcome this "barrier" during the intervention.

Then the participants were asked, "What must physical activity be like in order for you to participate more readily and regularly?" They unanimously suggested that physical activities must be "fun" and "what one wants to do". The subject of "want" raised further questions about motivation, which was something we discussed later during the intervention.

The above discussion took much longer than expected, but I felt it was well worth the time spent. I showed them an overhead transparency entitled "How to get started" that contained a list of ways to get involved in physical activities. Once again, I noticed that as soon as I started my "lesson" they reverted to being "passive". So once again, I made sure that I talked less than ten minutes and then handed out the goal sheet for the upcoming week. This time, I noticed that the goals they set were much more conservative, with most indicating that they really wanted to meet these goals.

The weather was not particularly nice, so we returned to the indoor track of the school to do our 10-minute walk. This time, Faye, who disappeared during last week's walk never made it down to the track. When asked about it later, she said she went to the bathroom and could not find us when she was done.

I felt very positive about the intervention at the end of our second session together. The participants were more "into it" this time compared to the previous session and I believed we would continue to work well together. Some of the participants were coming out of their shell a bit more, being noticeably more vocal this time. Rita and Debby were ESL (English as a second language) students and they seemed to struggle with our discussion. I actually spoke to Rita and Debby in Chinese at one point so that they could understand what was being discussed. Compared to Rita, Debby was much more out-going and was not afraid of making mistakes when it came to English usage. She reminded me of myself when I was a new immigrant and learning English when I first came to Canada. I knew, from my own experience, that she would not be offended if I spoke to her in Chinese from time to time. However, it was a risk I took with Rita because she was much more reserved than Debby and there was always the chance that she would feel embarrassed and become more withdrawn from our discussion. However, this proved not to be the case as she became more vocal and seemed to open up more in later sessions. When she did not understand something, she would just ask me, in Chinese, what I was getting at and that seemed to alleviate some of her anxiety caused by the language barrier.

Session 3: Finding Motivation

As soon as they entered the classroom, five of the nine participants claimed that they found it difficult to meet their goals this week. They seemed flustered and they wanted to tell me before I even had a chance to ask them just to "get this part over with". All of this happened within the first two minutes of the session. I was taken aback somewhat because this was a different "mood" expressed by the group. I explained to them that there was no failing in this intervention, and that they were not there to please me. I told them that it was quite all right, and perhaps even expected, that they did not reach their goals. Chantal said "well, this is the third week already, are we supposed to be doing better?"

I then asked what "better" meant, the student answered that I meant she should be setting more goals and meeting them all. I asked how the rest of the group felt and they mostly remained quiet. I then reiterated that the main goal of the intervention was to get them to be more physically active, but it was just as important/significant if they began to just think about being physically active more. The student then exclaimed that she was feeling both frustrated and guilty because she was thinking about it more, but was not able to actually do it. I reassured the student that this was really a good thing that happened and it should be treated as an accomplishment, not failure. The entire group seemed to breathe a collective sigh of relief and we were able to move on.

I asked the students what caused the difficulties in accomplishing their goals. They attributed the difficulties they were experiencing to the following reasons:

- Poor weather conditions
- "Laziness"

- Lack of motivation
- Procrastination
- I forgot about it
- It's not for marks

I asked the participants what their thoughts were when they were setting the goals and they responded with "I can do this", "Oh crap (sic), work is involved", and "this is taking time away from what I want to do". When asked what was the motivation for them to be physically active, they pointed to maintenance of health, weight control, perception of others (looking good to other people, to be seen as physically attractive), and personal preference. We discussed the importance of setting goals that are "authentic" to who they are, that it was important to identify one's lifestyle needs in order to be intrinsically motivated to engage in physical activities. We looked at some strategies for changing behavior and students came up with "doing what you enjoy" as a main strategy. They also suggested that planning, will power, and being with friends were good ways to get started. What was fascinating to me was a suggestion from Tara that competition/comparison with people she does not like actually motivated her to exercise!

The weather was finally pleasant enough for us to go outside. Our 15-minute-walk proved to be a very positive activity to do. As the participants and I walked together, we had a chance to get to know each other a bit better. I asked about their hobbies, and how their classes were going, etc. I also noticed that the students were starting to "gel" as a group. In fact, they decided to give this study a code name – "Operation 101" – so that I could communicate with them regarding our meetings over

the PA system in the school. I had been hoping to see a demonstration of genuine enthusiasm from them.

We did not get to the intended discussion on enjoyment due to our expanded deliberations on the topic of motivation. The participants were less then thrilled when the inventory of lifestyle and activity worksheet (Appendix F-3) was distributed. They said that, for the first time, this felt like "work" to them. This shed further insight into their possible motivation to join this intervention – that they thought it would be easier (as in work-free) and they did not want to expend a lot of effort in their participation. When I looked at their goal sheets after the session, I was surprised to find that five participants reported that they had either met, or exceeded their goals.

Session 4: Enjoyment/Finding Rewards

This session began very positively with students sharing their physical activity experiences during the previous week. Tara, Chantal, and Lucy had started running instead of "just walking" and they felt very proud about it. They also reported increased motivation to be physically active longer. The students indicated increased awareness as their main reason for increasing their level of physical activity. Another reason was that baseball season began during the past week and Chantal and Lucy found it more convenient to build "momentum" toward reaching their goals. Warmer and drier conditions were identified as the third reason.

Students shared some strategies they used to increase their level of enjoyment - listening to music and going with friends and interesting people. Tara and Chantal had been sick during the previous week and had not completed the self-monitoring worksheet. When we brainstormed over the enjoyment worksheet (Appendix F-4), having

music playing was identified universally as one way to increase level of enjoyment. The significance of music could not be overlooked. The group talked quite passionately about what kind of music they liked (i.e. rock, rap, pop). Students suggested that music took their mind off the fact that they were "working out" and that it reduced boredom during longer activity sessions. Other strategies included doing things with friends, and rewards. This was perfect because it led straight to our next topic, which was finding rewards.

We discussed ways of setting goals and giving rewards for attainment of both short-term and long-term goals. The students took about 15 minutes to complete the goals and rewards worksheet (Appendix F-5). Completing worksheets was not an activity that worked particularly well with the participants. A lot of them took a long time before writing anything down. Some questioned the need to complete these worksheets at all. Once again, they looked dejected and two students muttered that "this is work again and we don't want to do work today." Despite taking a long time, the students did identify rewards that could motivate them. The rewards students identified were all materialistic ones, i.e. CDs, DVDs, movies, and food. The long-term rewards were more expensive items such as Discman, MP3 players, and video games. I found that when they were completing the worksheet, lots of times Tara, Chantal, and Lucy would just look over to see what each other put down and they would do the same. I asked them if their responses were valid ones and they said that they all liked the same things, so the responses they put down were truthful ones. Another difficulty with worksheets was that students Rita and Debby needed a lot more time to complete the worksheet because they were ESL students. The "wait time" had to increase as a result and this often caused the rest of the group to lose focus and be bored.

We went outdoors for our activity time. For the first time, we split up the group - Tara, Chantal, and Lucy wanted to walk/jog a different route and the rest wanted to keep walking. We did this for approximately 15 minutes.

Faye did not attend the entire session. This was the same student who had previously disappeared during our walks. She came to see me before the session and told me that she wanted to attend a charity concert that was being held during lunch hour in the school. I tried to persuade her to attend the session but she felt strongly about attending the concert. This caused a great deal of disruption and frustration on my part because three other members of the group also wanted to leave. The room where the session took place (my classroom) is right next to the theatre, so the noise distraction became a constant reminder to those three girls that they were missing the concert. The quality of our discussion certainly suffered because of that. I remembered feeling particularly discouraged after this session because I was convinced that the girl (Faye) who went to the concert would not return to the intervention. Also, I could sense that maybe the novelty of being involved in a "study" had worn off a bit and I was very worried about potentially losing more students from the study.

Session 5: Strategies for Relapse Prevention

This was originally the "progress check" session. However, our discussion diverted to the topic of relapse and relapse prevention and so we continued with the flow of the conversation. We brainstormed the questions on the Activity Alert worksheet (Appendix F-7). Some of the reasons for cessation of physical activity included distractions (i.e. moving, entering new school), season changes, illness, and injury. The students all admitted that it took external factors to motivate them to become active again

(e.g. forced by others, reality, goal-setting urged by others). At this time, the students identified that exams, illness, poor weather, and cost were all likely to be causes for relapse. As for anticipated strategies for dealing with these obstacles, the group identified having an alternative indoor routine for physical activity and planning ahead as main strategies.

The students looked quite bored during the discussion period. They were only providing monosyllabic answers and required a lot of prompting on my part. Most of them said that they were tired after a long week and just did not want to think anymore. They also said that they found all this talking "boring" and they would rather be actually doing than just talking about doing physical activity. I felt that I was caught between following the protocol I had set out to do and doing what the students wanted to do. I was aware of my own frustration starting to build because I could not think of a strategy to make the discussions less boring. I did feel that maybe the students just did not want to go through the exercise because it was "work" to them.

This was definitely a recurring "theme" in that the students did not want to expend a lot of effort during the intervention and I had to make several adjustments in the delivery of the intervention to keep the intervention "appealing" to the students.

When it was time to do our activity, we all decided to go for a walk outside. Faye asked if she could play foot bag with her friends instead. I said no initially, since she also missed last week's session. What was interesting was that Faye then spent about five minutes trying to convince me that foot bag was a good physical activity and how doing that was going to be better for her. There was a lot of interesting information in that conversation, for example, "I feel good when I am with my friends" and "foot bag is way

more "cool" than just walking". I conceded and trusted her to be physically active for the next 20 minutes or so. One of the difficulties I encountered was that intramural activities were still going on and it was difficult to get to use the gym. I asked the students to bring something they would enjoy playing with (i.e. frisbee) for the next session in order to bring more variety to our sessions. I sensed that at this point, the participants were looking forward to doing something other than walking. I was looking forward to seeing what they would bring with them to the next session.

Session 6: Progress Check

The students finished going through the relapse planner (Appendix F-6). They then proceeded to write a brief journal entry (one page) about their experiences so far. Transcriptions of the students' entries are included in Appendix H. The data for this session were incomplete because Tara, Debby, and Faye missed this session due to illness and scheduling conflict (dental appointment).

This was the first time that the students were asked to do journal writing. For the two previous sessions, what was originally planned as an individual worksheet was modified to group discussion (going over the worksheet) in order to reduce the sense of "boredom" and "work" the students had. When I asked them to write the journal entry, the idea was greeted with some "moaning and groaning" about having to do "more writing". Then I explained to them that the entry did not have to be long, but should accurately capture their feelings about the intervention up to this point. This proved to be a very challenging activity for Rita because of her English. It took her a long time to come up with a sentence and she was constantly looking around to see if the others were finished. She stopped writing soon after the rest of the group was done. She did not want

to be the ones holding up the group. I asked her later if she would like to add more to her journal entries but she declined the opportunity.

After the journal writing, we went outdoors again. Unfortunately (and disappointingly), none of the students brought anything for our activity time, so we went for a walk again, but we went for a "semi-power walk" and it turned out to be a very pleasant experience. We walked together and talked about the students' upcoming summer plans.

As we shared during the goal-setting part of this session, students were asked when they felt most confident that they would achieve their goal(s); the students did not directly answer the question, but they did mention when they would feel the least confident:

- When they are in front of strangers (defined as people they don't know well)
- When they are trying something new
- When they are asked to do something they know they can't do
- When they are doing something they have failed before

Three of the above pointed to the lack of mastery experience – which led to low self-efficacy. This reaffirmed the importance of building in strategies that provided mastery experience to enhance self-efficacy in the intervention.

I also noticed that their goal-setting skills had improved significantly in the sense that they were getting very precise and right to the point. Gone were the long, elaborate but unrealistic goals. Students seemed to have found out precisely what they could succeed in and very quickly put those down as their "safe" physical activity goals. As seen in the second sample goal sheet (Appendix G-2), Tara now only listed one activity

which she knew she could/would do, and therefore, there was no risk of failure. What I noticed was the improvement in the self-monitoring section in stating when and where the activity would take place, and the fact that she exceeded her own expectations.

The fear of failure remained as a major determining factor behind the types of goals (physical activity) students picked. This was paradoxical since when asked what would reduce the likelihood of failure in doing an activity, the participants identified practice with instruction as one way. However, when I mentioned that practice would involve doing the activity in the first place, the participants fell silent. They then clarified that if it was a group setting where everyone was at approximately the same skill level, then it would not matter much. There seemed to be a fear of comparison on the students' part. They needed to feel competent by being with others who were at the same ability level in order to feel safe from potential embarrassment. At times I worried that I embarrassed them inadvertently by pointing out what seemed obvious and they would retreat into their shells. Fortunately, my worry turned out to be unwarranted.

After reading the journal from the six students, one key observation was that the students craved a variety to the activity portion of our sessions together. In their journal entries, Rita and Chantal expressed that they enjoyed meeting new friends and learning about physical activity. All of them felt that they learned more about goal setting and that it was very helpful to them. They also felt that attending this intervention made them think more about being physically active. One student (Grace) indicated that she was disappointed that the intervention was so theoretical and that not enough time was spent doing physical activity.

Another student (Chantal) revealed that a "bonus" about the intervention was that she got to go home earlier on Friday afternoons since the lunch session replaced her regular physical education class in the afternoon. This was the same student who often expressed an unwillingness to write / brainstorm during other sessions of the intervention. Jamie felt that perhaps she was recruited by mistake since she was already exercising lots but was screened as being in the preparation stage. She claimed that she was making up different goals just for the sake of writing something different on the goal sheets. She was also typically motivated by marks and displayed an indifferent attitude towards completing the goal sheets since they were not for marks.

I was most surprised by this remark from Jamie because her attitude in earlier sessions was quite good. She appeared to be enthused and did participate in discussions. She was very academically focused and I felt that as exams drew nearer, she was under increasing pressure to complete her work in other academic subject areas and her remark about "not caring" since the intervention was not for marks might have stemmed from feeling the pressure of school work in other subject areas. Another observation was that the timing of the sessions (on Fridays), which excused them from their afternoon physical education classes, was an incentive. I was happy to read that they were learning that there was a difference between physical activity and sports and that they were learning ways to build physical activity into their regular routine.

Session 7: Exploring other Options

After "checking in", the focus of our discussion turned to developing alternative physical activity routines for seasonal changes. We discussed the "Physical Activity in my Community" worksheet (Appendix F-8) together and students were pleasantly

surprised at the range of options available to them. Regarding the idea that some of these activities would involve paying fees (i.e. joining a health club), the students indicated that the "cost" aspect of the options was not a major concern to them. I surmised that this was due to the fact that the school is located in a mid to high socio-economic neighborhood, and the fact that some of them worked after school. By this session, final exams were just around the corner and students were being pulled in many different directions in terms of completing their regular course work (i.e. test/exam preparation and projects). Students seemed more distracted and were less willing to share. They were very non-committal when it came to setting goals for the up-coming week. "We won't have any time, so why bother writing them (goals) down?" Most expressed concerns that they would have no time to be physically active because they had to do "real" schoolwork. I asked them if what we have been doing seemed "unreal" to them and the students defined "real" as something that counted for marks. When asked, "what would make physical activity" real to them, they said if it involved "life or death" situations. It was pointed out to them that the consequences of inactivity could be "dire", and the students said, dismissively, that the consequences were so far away that they did not care about them right now.

In retrospect, I had missed a good opportunity to discuss relapse with them because that was exactly what they were going through. What I should have done was to identify the "moment" as a relapse/potential relapse and then brainstorm possible solutions/alternatives to overcome the feeling of helplessness that the students were feeling.

What was also interesting was that the students were very observant about my reactions to their statements. A couple of students wanted to reassure me right away that they were not saying that the intervention was unhelpful, but just that when exams came around, it was not highly prioritized. I thanked them for their comments and reminded them that the idea of life-long participation in physical activity was to make physical activity part of one's life just as brushing teeth was. One finds time to brush his/her teeth no matter how busy it gets, and that it is possible for physical activity to become such a "non-negotiable" routine. For some students, they seemed to understand for the first time what we were trying to accomplish over the last seven weeks, it was a good "food-for-thought" moment.

Session 8: Goal Setting for the Future

Once again, this session began with sharing and much of the discussion was focused on upcoming final examinations since this was the last week of classes. Students were given the contract for behavior change (Appendix F-9) and were asked to keep it posted at home (i.e. in their bedroom, on fridge door, etc.). The students then wrote their responses down for eight open-ended questions I presented to them. Their responses are transcribed in Appendix I.

The most important skill the students gained from this study was learning how to set realistic goals. Students felt more confident in achieving their goals because they learned how to set very specific goals that include the condition(s) under which they could succeed. The students also considered learning the distinction between sports and physical activity as somewhat significant. They expressed a "boost" to how they saw themselves because they were not as inactive as they thought they were.

The biggest change that took place was that being physically active had entered their consciousness, to the point that they felt guilty when they were just thinking about being active and were not actually being physically active. As the students achieved their weekly activity goals, they reported increased energy level and a newfound sense of well-being. This precipitated a more positive attitude regarding physical activity participation in half the students. The other students indicated no change in their attitude in the sense that they had always viewed physical activity participation as something they needed to do, and that view was not altered. The difference was that they were actually doing some activity now. Eight out of nine students indicated that they felt very confident about continuing the progress they had made in the study.

The students identified encouragement and companionship from family and peers as key sources of support. Surprisingly, none of them mentioned rewards as a motivating factor. The students found the goal sheets and goal setting skills to be really useful. Understanding the importance of physical activity was also identified, by the students, as being helpful in the future.

As positive as they seemed to be in their responses, Lucy and Grace indicated that they would rather have stayed in their regular physical education program while two others expressed ambivalent feelings about the intervention. The students missed the "fun" part of their physical education classes. Outdoor activities were the focus for the physical education program at this time of the year. As indicated in their previous feedback, they wanted there to be less theory and more activity in the intervention. So, it made sense that students would indeed miss their regular classes.

I felt really positive about the words the students now used to describe themselves. Many used words such as physically active, athletic, beginner, moderate, confident, and strong, compared to "lazy", and busy at the beginning of the study. The words they chose now reflected the "potential" to progress along a continuum (i.e. "beginner" had the potential to become "regular", "expert", etc.), whereas "lazy" was just a judgment they placed on themselves and did not reflect any potential intention to change.

I was most disappointed by some of the comments about them wishing they had stayed in the regular physical education classes. At the same time, I was encouraged by the fact that most of them came to realize that participation in physical activity did not have to be a hardship and that they intended to continue with their newly developed routines.

Post-Test

The post-test meeting actually took place during the exam period in June. Arrangements were made with each student to come to my classroom after they finished writing their last exam. This was done to minimize disruption to the students' studying schedules. I personally reminded each student on the day of her last exam to stop by in order to complete the study. Interestingly enough, I ran into Debby who was leaving the school after her exam without completing her posttest measures. She said she had simply forgotten and did complete the measures. After they completed the post-test questionnaires, they were informed that their participation in the study was officially over. The students were upbeat, possibly about finishing exams, and expressed their gratitude for being invited into the study. Some of these comments surprised me because

they contradicted some of the negative comments I collected a week before. This confirmed my belief that the negative nature of some of the responses from Session 8 was a reflection of the exam stress they were feeling and might not be how they truly felt about the intervention.

During the completion of post-test measures by four of the participants, I was called to the exam room to answer questions my academic students had on their subject exams. When I returned to my room, the participants had left already and I found out that they had not complete the backside of the self-efficacy questionnaire. As a result, the data collected were incomplete.

This concludes the qualitative description of what transpired during the ten sessions of conducting this program. What follows is the analysis of quantitative data collected via the pre/post-test measures.

## Quantitative Data

After eight intervention sessions, the participants of the study were asked to complete the stages of change questionnaire, the physical activity questionnaire, the exercise self-efficacy scale, and the exercise self-schema measure once again in order to obtain post-test data. The results are outlined below.

### Stages of Change Questionnaire

A total of nine participants were recruited on the basis of the stages of change questionnaire given at the beginning of the intervention. There were no students in the pre-contemplative stage, and only three students in the contemplative stage and, as a result, the researcher decided to include students in the preparation stage as well, to increase the number of participants. When the nine participants completed the questionnaire again at the end of the intervention, three participants identified themselves

as being in the preparation stage, three in action, and three in maintenance stage (see Table 2).

Table 2

Participants' pre-test and post-test results for stages of change questionnaire

| Respondent | Pre-test | Post-test | Change |
|---|---|---|---|
| Mary | Preparation | Preparation | Same |
| Rita | Contemplation | Preparation | 1 stage |
| Tara | Preparation | Maintenance | 2 stages* |
| Chantal | Preparation | Action | 1 stage |
| Lucy | Preparation | Maintenance | 2 stages* |
| Debby | Contemplation | Action | 2 stages |
| Faye | Contemplation | Maintenance | 3 stages* |
| Grace | Preparation | Action | 1 stage |
| Jamie | Preparation | Preparation | Same |

* questionable results (see preceding paragraph)

Although it is improbable that any of the participants could be in the maintenance stage at the end of the intervention since a person must have been doing physical activity for six months and the intervention only lasted for three months, it is possible. The question in the stage of change questionnaire asks "have you been doing this on a regular basis for the last six months?" Therefore, it is possible that at pre-test, participants had been doing regular physical activity for three months (hence preparation stage) and by the end of the intervention (three months later), they could have done regular physical activity for six months (hence Maintenance stage). This is a weakness in the questionnaire – the questionnaire is probably meant to be used as a screening device and not as a pre-test/posttest measure for a study that spanned only three months. There could

also be a possible mis-interpretation of the questionnaire. This brought into question the suitability of using the stages of change questionnaire as a pre-posttest comparison, a question that will be addressed in Chapter 5 of this thesis.

Physical Activity Questionnaire

The average amount of weekly physical activity prior to the intervention was 352.9 minutes (SD = 300.5). At the end of the intervention, the weekly average was 482.9 minutes (SD = 524.8) (see Figure 1 and Table 3). The data were analyzed using one-way repeated-measures analysis of variance - no statistically significant differences were found (F needed for repeated measures effect was 5.32, F obtained = 1.01) Calculations are included in Appendix J-1. Despite insignificant statistical results, it needs to be stated that the number of minutes spent on weekly physical activity increased in eight of the nine participants. Another important observation was that seven of the nine participants met the required amount of physical activity (150 minutes per week) according to the Canada's Physical Activity Guide.

Figure 1
Pre-test and post-test comparison of weekly amount of physical activity obtained from the Canada Fitness Survey

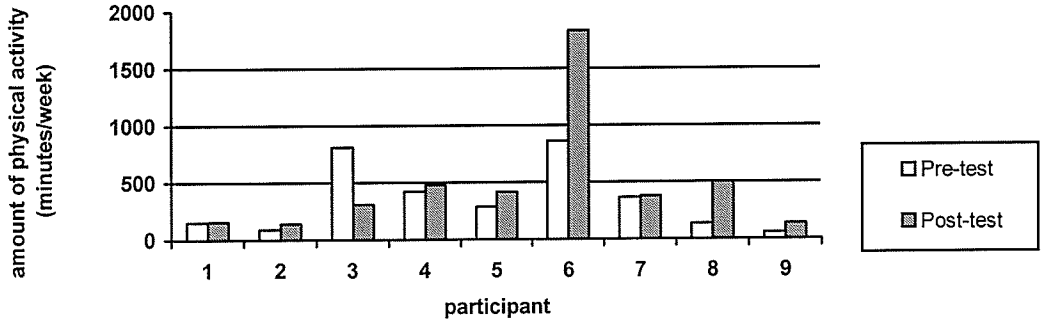


Table 3

Pre-test and post-test comparison of weekly amount of physical activity obtained form the Physical Activity Questionnaire

| Respondent | Weekly amount of physical activity (minutes) | |
|---|---|---|
| | Pretest | Posttest |
| Mary | 152.5 | 160.0 |
| Rita | 90.0 | 138.9 |
| Tara | 810.0 | 307.5 |
| Chantal | 420.0 | 480.0 |
| Lucy | 285.0 | 415.0 |
| Debby | 861.3 | 1830.0 |
| Faye | 367.5 | 377.5 |
| Grace | 135.0 | 500.5 |
| Jamie | 55.0 | 137.5 |
| **Mean** | **352.9** | **482.9** |

In a cross comparison of pretest/posttest results for both stage of change and weekly amount of physical activity (Table 4), several discrepancies were observed:

- Tara, whose weekly amount of physical activity dropped from 810 minutes to 307 minutes reported herself as having moved from preparation stage to maintenance stage. Tara was already very active prior to joining the intervention. She indicated that being in the intervention actually reduced her physical activity because there were a lot of discussions in the intervention and not enough activity. Not only did she lose the chance to participate in activity during her physical education class on Fridays, she also lost a chance to be more active during the lunch hours when the intervention was run.

Table 4

Comparison of pre-test and post-test data for stage of change and weekly amount of physical activity

| Respondent | Stage of Change | | Weekly amount of physical activity | |
|---|---|---|---|---|
| | Pretest | Posttest | Pretest | Posttest |
| Mary | Preparation | Preparation | 152.5 | 160.0 |
| Rita | Contemplation | Preparation | 90.0 | 138.9 |
| Tara | Preparation | Maintenance | 810.0 | 307.5 |
| Chantal | Preparation | Action | 420.0 | 480.0 |
| Lucy | Preparation | Maintenance | 285.0 | 415.0 |
| Debby | Contemplation | Action | 861.3 | 1830.0 |
| Faye | Contemplation | Maintenance | 367.5 | 377.5 |
| Grace | Preparation | Action | 135.0 | 500.5 |
| Jamie | Preparation | Preparation | 55.0 | 137.5 |

- Faye, who reported only marginal increase in her weekly amount of physical activity, also reported a jump of three stages from contemplative to maintenance.
- Jamie had the lowest amount of pre-test physical activity and yet she identified herself as being in the preparation stage, when Debby, who had the highest amount of pre-test physical activity, only identified herself as being in the contemplative stage.
- Debby reported 1830 minutes of physical activity per week in the posttest. The researcher found this to be highly questionable as this was equivalent to approximately 30 hours of physical activity per week. One possible explanation to this could be that Debby was trying to please me by reporting what she thought would be "good" data for the study. We did develop a strong rapport during the study. Debby's fear

of failure could be another possible explanation. She may have inflated the amount of physical activity because she did not reach the required amount set out by the Canada's Physical Activity Guide.

These discrepancies question both the accuracy of the physical activity measure and the suitability of using the stage of change questionnaire as a pre/posttest comparison over a short period of time. Participants might have felt pressured to report a change to avoid "failure" or to please the researcher.

Exercise self-efficacy scale

The exercise self-efficacy scale evaluated the participants' self-perceived ability to be physically active in spite of three influences - internal feelings, competing demands, and situational demands. The participants' scores for each type of barrier were analyzed separately and presented in Table 5.

The mean score for self-efficacy to overcome internal feelings increased from 41.1 to 47.0 (F value = 0.71, F needed for repeated measures effect was 5.32, not significant) (calculations in Appendix J-2). Seven participants increased their scores and two participants decreased their scores in this category of barriers.

The mean score for self-efficacy to overcome competing demands decreased from 47.6 to 46.0 (F value = 0.029, F needed for repeated measures effect was 5.32, not significant). Only two out of nine participants experienced a substantial increased in their scores in this category of barriers. The remaining seven all reported a decrease in their scores.

The situational barrier variable could not be analyzed due to missing post-test responses for five participants who did not complete the backside of the questionnaire; as

a result, responses for five of six questions regarding situational barriers were not obtained.

Table 5

Pre-test and post-test comparisons of self-efficacy to overcome three types of barriers

| Respondents | Self-efficacy to overcome three types of barriers | | | | | |
|---|---|---|---|---|---|---|
| | Internal feelings | | Competing demands | | Situational | |
| | Pre-test | Post-test | Pre-test | Post-test | Pre-test | Post-test |
| Mary | 24.3 | 50.0 | 6.0 | 46.0 | 6.7 | 40.0 |
| Rita | 17.1 | 21.4 | 32.0 | 23.3 | 6.7 | - |
| Tara | 67.1 | 64.3 | 72.0 | 66.0 | 56.7 | 56.7 |
| Chantal | 54.3 | 42.9 | 68.0 | 45.0 | 30.0 | - |
| Lucy | 48.6 | 25.7 | 68.0 | 20.0 | 23.3 | - |
| Debby | 45.7 | 50.0 | 48.0 | 42.0 | 60.0 | 61.7 |
| Faye | 38.6 | 45.7 | 50.0 | 56.0 | 40.0 | 46.7 |
| Grace | 54.3 | 54.3 | 66.0 | 63.3 | 36.7 | - |
| Jamie | 20 | 68.6 | 18.0 | 52.0 | 6.7 | 33.3 |
| **Mean** | **41.1** | **47.0** | **47.6** | **46.0** | **29.6** | **-** |

- Participants with incomplete questionnaire

Exercise Self-schema Measure

Participants were categorized as non-exerciser schematics, exerciser schematics, or aschematics, based on definitions outlined in Chapter Three. On the pre-test, four participants were identified as non-exerciser schematics, three were aschematics, and two were exerciser schematics.

In self-schema theory, having no self-perceived concept of being an exerciser (aschematic), is preferred over having a concept of being a non-exerciser (non-exerciser schematic). Therefore, the desirable progression of change is to go from being a non-

exerciser schematic to being an aschematic, to being an exerciser schematic. Four participants progressed along the continuum according to the progression while five participants remained unchanged in their schematicity.

However, these five participants increased their scores within their category of schematicity. In particular, the three non-exerciser schematics became aschematics for exercise and one non-exerciser schematic became an exerciser schematic. Of the three aschematics, two stayed as aschematics but increased their scores. The other aschematic became an exerciser schematic (see Table 6). A histogram of the shifting frequencies among the three categories of schematicity for exercise behavior is included in Figure 2.

Table 6

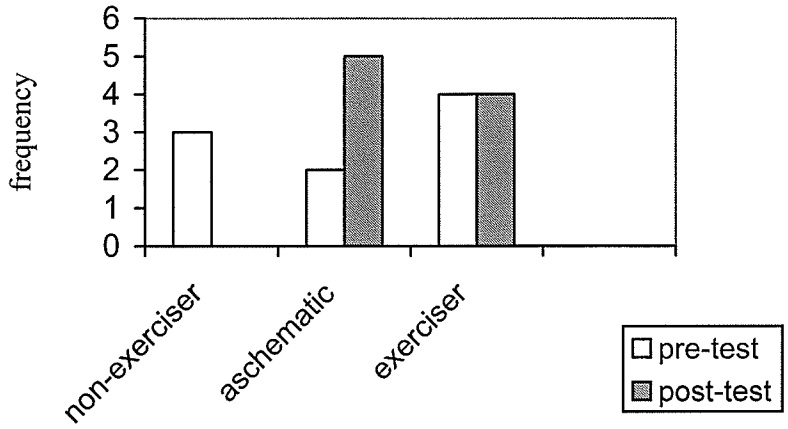
Changes in participants' schematicity based on the exercise self-schema measure

| Participant | Pre-test | Post-test | Change |
|---|---|---|---|
| Mary | Non-exerciser schematic | Exerciser schematic | + |
| Rita | Non-exerciser schematic | Aschematic | + |
| Tara | Exerciser schematic | Exerciser schematic | Same |
| Chantal | Non-exerciser schematic | Aschematic | + |
| Lucy | Aschematic | Aschematic | Same |
| Debby | Aschematic | Aschematic | Same |
| Faye | Exerciser schematic | Exerciser schematic | Same |
| Grace | Non-exerciser schematic | Aschematic | + |
| Jamie | Exerciser schematic | Exerciser schematic | Same |

+ indicates movement in the desirable progression

Figure 2

Comparison of Frequency distribution of schematicity for exercise behavior




When pre/posttest data for schematicity were compared with the amount of physical activity data in Table 7, one can see that movement in schematicity did correspond with the amount of physical activity. Movement along the schematicity continuum was always associated with increase in amount of physical activity.

In Tara's case, this showed that even though her amount of physical activity decreased, it did not change how she perceived herself in terms of her schematicity for exercise. She continued to view being physically active as being descriptive of, and important to her.

For Faye, who missed intervention sessions and tended to "skip" the activity portion, her schematicity stayed the same, despite her stage of change having jumped from contemplation to maintenance stage with only a marginal increase in amount of physical activity.

Table 7

Comparison of pre-test and post-test data for stage of change, weekly amount of physical activity, and schematicity

| Respondent | Stage of Change | | Weekly amount of physical activity | | Schematicity | |
|---|---|---|---|---|---|---|
| | Pretest | Posttest | Pretest | Posttest | Pretest | Posttest |
| Mary | Preparation | Preparation | 152.5 | 160.0 | Non-exerciser schematic | Exerciser schematic |
| Rita | Contemplation | Preparation | 90.0 | 138.9 | Non-exerciser schematic | Aschematic |
| Tara | Preparation | Maintenance | 810.0 | 307.5 | Exerciser schematic | Exerciser schematic |
| Chantal | Preparation | Action | 420.0 | 480.0 | Non-exerciser schematic | Aschematic |
| Lucy | Preparation | Maintenance | 285.0 | 415.0 | Aschematic | Aschematic |
| Debby | Contemplation | Action | 861.3 | 1830.0 | Aschematic | Aschematic |
| Faye | Contemplation | Maintenance | 367.5 | 377.5 | Exerciser schematic | Exerciser schematic |
| Grace | Preparation | Action | 135.0 | 500.5 | Non-exerciser schematic | Aschematic |
| Jamie | Preparation | Preparation | 55.0 | 137.5 | Exerciser schematic | Exerciser schematic |

# CHAPTER 5
# DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The main intent of this study was to increase participation in physical activity among sedentary high school girls through an intervention that focused on increasing the participants' exercise self-efficacy and exercise self-schema, as well as improving behavioral skills (goal-setting and self-monitoring). A peripheral intent was to evaluate the effectiveness of implementing a behavioral program as an alternative to the traditional physical educational curriculum in an actual field setting (high school). This chapter will begin with the researcher's summary of the major findings obtained from the using both qualitative and quantitative data, followed by a description of the changes in the participants observed by the researcher, and an evaluation and suggestions for the intervention. It concludes with recommendations for future research and application.

## Effectiveness of Intervention

### Qualitative Analysis of Effectiveness of Intervention

The study attempted to gain a global understanding of the relationship between exercise behavior, self-efficacy, and self-schema by examining if and how self-efficacy and self-schema changed over the course of the intervention. An interpretive, qualitative approach was used to help the researcher to understand what was significant to the participants. This included the use of different types of group discussions (guided and open ended), the participation of the researcher in the intervention (to make close observation), and the participants' own descriptions of their experiences during the intervention. This provided multiple sources of data for analyses (triangulation) in order to better understand the participants' experiences in the intervention.

Journal entries. Participants joined the study for various reasons. In Mary's case, it was because she had been thinking about becoming more active and was looking at the study as a means to learn "how" to get there. For Rita and Chantal, it was to satisfy their social needs to meet new people and stay with their friends. This was expected since these were Grade 10 students who were new to the school, therefore, it is natural that they would want to establish new friendships with their peers. This was particularly true for Rita because being new to the country, the study also served her need to learn more English. Both Chantal and Lucy had physical education class as the last class of the day and they enjoyed being able to go home early on Friday afternoon as a result of participating in this study. I believe that this was also true for Tara, who was friends with Chantal and Lucy. However, Tara was absent the day the journal entries were recorded. For Jamie, it was curiosity to find out more about the study that motivated her to join in. She was a really good sport in the sense that she stayed in the study even though she did not feel that she had benefited from the intervention. At the end of the intervention, she did express regret at joining the study.

From the participants' account, learning about the importance of physical activity and learning that being physically active does not have to involve heavy participation in a particular sport helped them to regard themselves in a new light. Firstly, they now understood that physical activity is not just a "leisure" activity, but an essential one in order to achieve optimum health. Secondly, participants all learned how "easy" it was to become physically active. Instead of wondering if they could become physically active, they now knew they can.

In retrospect, I should have included more journal-writing as part of the intervention. I would have liked to have at least one more journal entry from each participant earlier in the intervention (Session 3) so that a comparison of how the intervention was perceived could be made.

Field notes. The observations made by the researcher have been included in the descriptions of the intervention sessions in Chapter 4. There are some common themes from the researcher's observation.

With the exception of Mary, the participants were only interested in expending minimal effort in the intervention. In many ways, they expected to be asked to do less, not more, than they would in a regular physical education class. This can be seen by their reluctance to do any elaborate writing or reading, and by their disinterest in the more theoretical portion of the intervention.

Having "fun" was very important to the participants. However, their idea of fun was that it must not include "work". They enjoyed the activity portion of the intervention session because it was easy, as there was no reading, thinking, or writing involved. Despite indicating a desire to experience a greater variety of physical activity, none of them made the effort to contribute to suggestions when given the opportunity to do so. For some of the participants, I suspect that this unwillingness to "work" is a common pattern in other areas of their life as well.

It would have worked out much better had the researcher taken it upon herself to provide a range of different activities for the participants to choose from rather than relying on the participants to "take charge". The original intention was that if the participants felt that they had a say in what activity to do in the intervention, they would

experience greater motivation and involvement in their participation in the study. However, this did not turn out to be the case.

Transcriptions of participants' written response. Participants reported at the end of the intervention (Session 8) that they gained valuable knowledge in setting goals. They also learned about the benefits of being more active. This coincides with what they wrote in their journal entries two weeks previously.

Mentally, participants became much more conscientious about being physically active. They thought more about being active and one participant mentioned that she was self-monitoring her activity habit. Physically, participants reported more physical activity. This corresponds to the quantitative results which showed an increase in the amount of physical activity. Three participants wrote that they had more energy compared to before the intervention. Debby used the word "stronger" twice in her transcript and Mary wrote that she felt better about attending her physical education class because she felt better about herself. Five participants indicated that they felt differently about participating in physical activity at the end of the intervention, mostly becoming more willing to try because it was not as difficult as they had previously thought.

Five participants felt that support and encouragement from friends and family were important for them to maintain the progress they had made. What interested me was that Debby put down "nothing" as her response without any further explanation. I wonder if that meant she believed that she could motivate herself to keep being physically active.

Most participants (seven out of nine) felt confident that they would continue to be physically active after the completion of the intervention. This feeling was supported by

the quantitative data where there was an increase, although marginal, in the mean self-efficacy scores for overcoming the influence of internal feelings.

Just over half the participants (five) indicated that they were glad to have taken part in the study because they learned useful information (e.g. importance of physical activity, behavioral skills, etc.), and they met new people. Two participants expressed ambivalent feelings: sometimes they missed their regular physical education classes while other times they were glad to be in the study. Only two participants definitively indicated their wish to have stayed in their regular physical education classes.

By the end of the intervention, participants progressed from only using the word lazy to describe themselves to using other words like active, confident, strong, athletic, beginner. On two occasions, the word lazy was used in combination with these other words. This was a big contrast from the first session when they were asked the same question. The words used here were more positive, perhaps reflecting the improved self-image of the participants. This also supported their increase in self-efficacy scores. The use of the word "athletic" may have been an indication of emerging self-schema for physical activity in the participants.

One difficulty the researcher encountered was that it was difficult to ask the participants to produce any detailed written responses. Most of the participants wrote single word responses if they weren't prompted to expand the word into a sentence. Very few responses included more than one sentence. This resulted in a lack of "depth" in the analysis by the researcher. It was very difficult to interpret the meanings/emotions behind these short, brief responses. On the other hand, the researcher was worried about the

potential negative effects of pushing them to produce more on the participants' motivation and adherence to the study.

Data Triangulation. The intervention was successful at elevating the overall amount of weekly physical activity for most participants. The researcher believes that this was largely the result of improved behavioral skills in goal setting and self-monitoring. When asked about the most valuable skill acquired from the intervention, the feedback that was consistent across all participants was that they learned how to set realistic/attainable goals. The actual process of writing down their weekly goals, and the details of how the goals would be attained, worked like a contract. The goal setting worksheets required the participants to identify the conditions under which the target behavior, being physically active, would occur; and the weekly sharing of experiences made the goals "public" ones. Both are important aspects of effective goal setting (Martin, 2003).

During the weekly "de-briefing" of their experiences, all participants mentioned that the intervention caused them to think about exercising more. Sometimes they felt "guilty" if they did not at least try to achieve their goals.

This intervention was particularly helpful in increasing participants' self-perceived ability to overcome the influence of internal feelings to become more physically active. The author arrived at this conclusion based on the written feedback from the participants (transcription from Session 8, Appendix I). The participants indicated that they believed in themselves more after their increased participation. They felt stronger and believed they could stay active longer. The researcher believes one of the main reasons for this result was that the intervention provided opportunities for the

participants to be active. This allowed them to feel, first hand, that being physically active was not difficult. The activity we did (walking) was really fail-safe and this provided "mastery experience", which is one way of developing self-efficacy (Maddux, 1995).

As indicated in the feedback, participants appreciated the activity portion of the intervention more than the discussion part. One of the less appealing aspects of regular physical education programs was that, with a focus on sports, lengthy instructions were required to teach the complex skills required to perform a sport skill. This was indicated as a "turn off" for students.

One goal of this study was to see if exercise self-schema could be changed through the intervention. Theoretically, the development of an exercise self-schema would be most desirable for physical activity, followed by aschematicity for exercise (Kendzierski, 1988). Kendzierski (1994) pointed out that exercise self-schema should be low for pre-contemplators and contemplators since they do not intend to exercise. If pre-contemplators and contemplators experience changes in their "stage of change", self-schemas should also increase. This was observed in the participants in this study. Among the three contemplators recruited, one of them was a non-exerciser schematic and the other was an aschematic.

The non-exerciser schematic identified herself as an aschematic at the end of the intervention, while the aschematic strengthened her self-schema (considered descriptors of physical activity more descriptive of her and more important to her compared to before the intervention) but remained as an aschematic. One contemplator was identified as an exerciser schematic - this was contradictory to Kendzierski's research. Kendzierski

(1994) also pointed out that individuals in the preparation stage may possess higher, but "fragile" exercise self-schemas. These self-schemas may be strengthened as they progress along the stage of change continuum. This was reflected in the study as the participants' schematicity either stayed the same or increased as they progressed in the stage of change continuum.

Once the participants were introduced to the idea that physical activity can be "just" daily activities that they were already doing, they felt that they were not as inactive as they originally thought. As a result, they may have felt that they were more active at the end of the intervention. This could have led to a change from being an non-exerciser schematic (not considering herself as active) to at least being an aschematic.

Participants reported increased incidents of physical activity, but not necessarily increased motivation to be involved in physical activity. Three participants seemed to be very motivated to be physically active at the beginning of the study. In fact, in their reflections, they did not feel the intervention provided enough opportunity for them to be active. They indicated their preference to have stayed in the regular physical education classes. However, it is the opinion of the researcher that they must have found something motivating about the intervention because they did not return to their gym classes, despite having the option to do so. It is very probable that the intervention provided emotional safety for the participants. Since there was no emphasis on a particular sport skill, the activities in the intervention were all "fail-safe". In one of our discussions, participants indicated the fear of failure and embarrassment as reasons they did not like their physical education class. Also, there was no question that being able to leave early on Friday afternoon was an added incentive for the participants to stay in the study.

Summary of Changes in Individual Participants

Mary. Although Mary remained in the preparation stage, she identified herself as an exerciser schematic at the end of the intervention, compared to a non-exerciser schematic prior to the intervention. She showed tremendous pride in her own accomplishments over the course of the intervention. As of this writing, she has joined a local fitness club with her family. Of all the participants, the transformation in Mary was the most remarkable. Mary developed a belief in herself that manifested itself in the way she walked (with improved posture) and the way she talked (with more assurance). Although her external physical appearance did not change very much at all, it was obvious to me that internally, she was feeling much better about herself at the end of the intervention than before.

Rita. Rita moved from the contemplation to preparation stage and she changed from being a non-exerciser schematic to an aschematic. She was learning a new language and getting used to a new country. She continued to be very quiet but not as withdrawn. By the end of the intervention, Rita got to the point where she answered some questions in front of the whole group. I think the fact that I share the same ethnic background (Chinese) with Rita played an important role in her staying in the intervention. When we walked together, I would ask her how she was liking Winnipeg and questions that asked her to express how she was feeling. I was able to relate to those feelings she expressed because I was an immigrant myself and I came to Canada at the same age that Rita did. The intervention satisfied her need to meet new people. She indicated from the onset that meeting new people was her main reason for joining the intervention.

Tara. Tara remained an exerciser schematic. She moved from the preparation to the maintenance stage. She continued to enjoy physical activity, but now understood the role of careful goal setting in preventing relapse. The intervention did not help Tara's exercise behavior because she was already highly motivated in this area. I agreed with Tara's own assessment that she was not properly screened and ended up in the study by "mistake". Tara was a very good sport, she gave everything we tried a chance but realized quickly that she did not need this intervention to increase her physical activity. When I asked why she stayed in the intervention, she said that her friends (Chantal and Lucy) were in it and getting Friday afternoon off was a nice bonus.

Chantal. Chantal changed from a non-exerciser schematic to an aschematic. She moved from the preparation stage to action stage. Just like Tara, she continued to enjoy being active. Once again, the intervention did little to change her exercise behavior. She did enjoy being with her friends, Tara and Lucy, throughout the intervention. Recently, I ran into her at a lunch-hour aerobics class in the school. She seemed very proud and very glad to have me bear witness to her participation.

Lucy. Lucy identified herself as being in the maintenance stage at the end of the intervention. Even though she remained aschematic, she was more active by the end of the intervention. In the beginning, she was very dependent on Tara and Chantal when it came to being active. Lucy would do things if Tara and Chantal would. I think part of this came from Lucy's desire to please her friends. By the end of the intervention, Lucy had learned to set activity goals for herself. In some way, I think Lucy was trying to please me as well. In our discussion, she tried to give the "right" answer to move the discussion onward. Sometimes when I asked a follow-up question regarding a response she had

given, she would say "I didn't mean what I said…". Toward the end of the intervention, Lucy became more true to herself and in fact, did not volunteer as many responses as she once did, but when she did, I felt that she responded truthfully.

Debby. Debby moved from the contemplation to action stage and she continued to identify herself as an aschematic. Debby and Rita became very good friends during the intervention. Both were ESL students and recent arrivals to Canada. Debby reported a very large increase in the amount of physical activity in the posttest measure, perhaps unrealistically so. However, that was not reflected in attitudinal changes. I wondered if Debby was trying to please me by reporting such a large increase in her weekly amount of physical activity. This could explain why this dramatic change in physical activity was not accompanied by changes in self-schema measure.

Faye. Faye moved from the contemplation stage to the maintenance stage. She stayed as an exerciser schematic. She was more active than initially thought, but she preferred to socialize with her friends outside of the intervention and therefore, did not experience the full benefits of the intervention. She consistently would disappear or want to do another activity during the activity portion, but at the same time, would tell me that she was really enjoying the intervention. Faye also had a tendency to exaggerate her degree of being active. I found her pre-test/posttest scores for the measures questionable. Towards the end of the intervention, Faye became more honest about her feelings regarding the intervention.

Grace. She moved from the preparation to action stage and went from being a non-exerciser schematic to an aschematic. Grace tried out all the strategies talked about in the intervention and showed great progress in increasing the amount of physical

activity. She became more out-going by the end of the intervention, and along with Mary, seemed to change the most, both in their attitude toward physical activity and in their participation.

Jamie. Jamie remained in the preparation stage and an exerciser schematic. Since Jamie was already active, the intervention did not change her much. Jamie was a serious student and felt toward the end that the intervention was a bit of a distraction from her academics. The discussion on relapse was most valuable to her because she felt that would be something she would have to deal with as she tried to maintain her academic performance along with a healthy amount of physical activity.

Quantitative Analysis

Physical activity. The weekly amount of physical activity increased in eight of the nine participants. Although the group mean increased from 352.9 minutes/week to 482.9 minutes/weeks, the result was not statistically significant. This was probably because of the small sample size and large standard deviation.

In answering the physical activity questionnaire, the participants may not have included time they spent on activities they did not believe to be a physical activity. As a result, the pre-test scores for weekly physical activity (minutes) may have been inaccurate (under-reported). Since the commencement of the intervention (May) coincided with seasonal changes, the increase in amount of physical activity could also be attributed to improved outdoor conditions which allowed for a wider range of physical activity.

Some participants might also have underestimated the frequency/amount of their physical activity because of their perception that physical activity equates to participation in sports activities (i.e. basketball, volleyball).

Stage of change. There were three contemplators and six participants in the preparation stage at the beginning of the intervention. At the end, three participants identified themselves as being in the preparation stage, three in action, and three in the maintenance stage. Seven of nine participants indicated a change in their stage of change; three students moved up one stage, three students moved up two stages, and one student moved up three stages. Two participants stayed at the same stage. The researcher questions the accuracy of the result that showed three participants had progressed to the maintenance stage. Although it is theoretically possible, it is most probable that the participants mis-interpreted the questions on the questionnaire.

Self-efficacy. The mean self-efficacy score for overcoming barriers related to personal feelings increased from 41.1 to 47.0, with seven of nine participants indicating an increased self-efficacy to overcome this category of influences. Two participants indicated a decrease in self-efficacy scores. The mean self-efficacy score for overcoming barriers related to competing demands decreased from 47.6 to 46.0, with seven of nine participants indicating a decrease in this category. Only two indicated an increased self-efficacy score in this category. The self-efficacy score for overcoming situational demands was not analyzed due to incomplete data collection, as explained in Chapter 4.

The exercise self-efficacy questionnaire was the most difficult one for the participants to understand. This may be due to the abstract nature of the concept itself. Two participants were ESL students and experienced a lot of difficulty interpreting the

meaning of the statements on the questionnaire. All of the participants needed reminding that they were rating what they thought they could do and not what they did.

The grouping of the self-efficacy statements into the categories of internal feelings, competing demands, and situational demands was unclear at times. Some of the statements could potentially be included in more than one category, and therefore, could have a confounding effect on the interpretation of the results. However, the effect was minimal, since no statistically significant results were obtained due to the small sample size in this study.

Self-schema. Five of nine participants did not change in self-schema for exercise. Four indicated a change: three changed from being non-exerciser schematics to aschematics and one changed from being a non-exerciser schematic to an exerciser schematic. The researcher believes that the intervention was successful, in the sense that the study began with four non-exerciser schematics, and ended with no non-exerciser schematics. Furthermore, both participants who stayed as aschematics registered a score that was closer to the upper limit for the aschematic range. Also, one of the defining characteristics for an aschematic is that she does not consider exercise descriptors to be important to her self-image. Given the short duration of the intervention, it was not expected that a significant change regarding what was important to one's self-image would occur.

The researcher found the results of the schematicity measure were justifiable based on the participants' personalities and behaviors throughout the intervention. The participants who benefited the most from this intervention were the non-exerciser schematics. By the end of the intervention, they no longer perceived themselves as non-

exercisers (aschematics) and one participant even began to perceive herself as an exerciser (exerciser schematic). This may be positively related to the "readiness" to become physically active as supported by the fact that three of the four non-exerciser schematics also increased their stage of change and amount of physical activity.

Words on the questionnaire like "spontaneous" and "introverted" were very difficult for the ESL students to understand. However, since those words were included as fillers and not the items for which the scores were tabulated, the effect should have been minimal.

Both the exercise self-efficacy and exercise self-schema questionnaires took a very long time for the participants to comprehend and complete. Some participants, especially the ESL students, may have rushed to finish the questionnaires because they felt pressure (inadvertently) to let the group move on to the next task. They may also have rushed to avoid embarrassment for being the "slowest".

## Evaluation and Suggestions for Intervention

### Start Date of Intervention

The high school where the study took place operates under the semester system. This means that the school year is divided into two semesters and each semester is further divided into two terms. A full credit course runs throughout an entire semester whereas a half-credit course runs for only one term. The Physical Education course is a half credit course that runs in each of the four terms. The start of the study was scheduled to coincide with the beginning of the Physical Education course in the last term of the second semester on April 7. However, the intervention did not begin until April 30th because the start date was delayed due to a delay in receiving approval from the Ethics

Board. Also, the physical education teacher in the school, who agreed to administer the "stages of change questionnaire", was heavily involved with other school activities during the same week the program was set to begin. The teacher delayed administering the questionnaire for a week to accommodate her schedule.

The delay of the start date of the intervention turned out to be very significant since the intervention had to fit into the semester schedule of the school and terminate prior to final exam period. This resulted in the merging of the pretest with Session 1 instead of having the participants complete the pre-test measures during a separate session prior to Session 1. On numerous occasions, the discussion that took place exceeded the time budgeted for a topic (i.e. relapse) and had to be stopped to ensure the intervention covered all other proposed topics as well. This caused some of our discussion/sharing to be rushed and incomplete. It would have been better to have started the study earlier so the post-test did not conflict with the exam period in June. This might have enhanced the success of the intervention.

Length of intervention

The duration of the intervention posed a significant limitation on the type of strategies used. The individual interviews originally planned to take place prior to Session 1 had to be converted to a group discussion. With only eight weeks to work with, compounded with having only 65 minutes per session, discussions were cut short in order to fit the physical activity in, since the researcher believed that the physical activity portion of each session was equally important. Even though the participants indicated that they did not like to "sit around and talk", the researcher strongly believed the discussions served two important functions. Firstly, they brought into focus the main theoretical

concepts the intervention attempted to deliver, such as physical activity (vs. sport), self-efficacy, and relapse, etc. Secondly, they provided reflective experiences for the participants so that they got the opportunity to internalize their experiences of physical activity in order to better understand the personal barriers they each had to overcome. However, with Grade 10 (Senior 2) students, it was a questionable goal to achieve because they did not yet have the emotional maturity to carry out such introspective analyses.

The researcher would recommend that the intervention should be ten weekly sessions in length. This would mean that the intervention should span an entire term, for schools operating under the semester system (two terms per semester).

Emotional climate

The intervention was established in a relaxing and open environment. The researcher was able to establish rapport with the participants from the onset of the intervention which added to its success. This was particularly the case with Rita and Debby, the ESL students. For them, participation in the study served as a "safety port" for them. They found a teacher in the school who shared their experiences. The researcher's honesty in sharing her past "failing" experiences, i.e. self-image issues, helped to establish the tone of discussion with every participant. There was, at all times, a sense of mutual respect between the researcher and the participants. On more than one occasion, participants tried to reassure the researcher that the intervention was going well, without any outward expression of concern from the researcher.

The use of group discussions to encourage open discussion and free expression of differing opinions promoted positive interaction among participants as well as between

researcher and participants. Participants were able to voice opinions they held about regular physical education classes, which they did not feel comfortable doing in a class setting.

Main Benefits

The intervention offered a truly different alternative to physical education class. It focused on behavioral skills instead of "sport skills", and it succeeded in promoting the importance of being physically active during leisure time.

The portion of the intervention that developed skills in goal setting and self-monitoring was most noted and appreciated by the participants. The participants all indicated that the biggest difference the intervention had made for them was their newly developed ability to set realistic goals that were attainable. Subsequently, the achievement of these set goals further motivated them to set more challenging goals as they progressed.

Implementation

The school was already known for having an outstanding physical education program that included the teaching of behavioral skills such as time management and reinforcement, although to a lesser extent and in a somewhat different way compared to the intervention. Some of the effectiveness of the intervention might have been masked because of the small number of recruits and the overlapping content (e.g. teaching of behavioral skills) between the regular physical education program and the intervention.

Despite the intent of the researcher to get the participants to move outdoors early in the intervention, a very rainy and cold spring (May) limited the "mood" of the intervention from the onset. However, this was not a major factor since part of the

intervention was to help participants develop alternative indoor routines of physical activity.

The intervention lacked variety in terms of the types of physical activity experience it provided. The participants only had the opportunity to participate in walking or light jogging, twice indoors and six times outdoors. Whereas the weather conditions were out of the researcher's control, insufficient attention was given to planning a variety of activities. This required arranging for the use of the school's gymnasium and the gathering of equipment. The researcher relied on the participants to bring equipment for activities they wanted to do themselves and such an approach proved to be ineffectual. Despite the fact that the participants "wanted" to do something different, they did not really want to do the work (as in bring the equipment). However, since it was one of the goals of the intervention to get participants to experience different physical activities, the researcher could have had the equipment ready and should not have left that responsibility to the participants. This was a very valuable lesson learned by the researcher.

## RECOMMENDATIONS

### Recommendations for Interventions in Schools

The delivery of this intervention revealed several issues that must be resolved in order for successful school-wide implementation. These issues are discussed in the paragraphs that follow.

During the running of this intervention, which was only held during one lunch hour a week, we had to overcome distractions in the form of a local mall, a multicultural

show, and a charity band concert. Other competing activities included extracurricular club meetings and extra academic meetings held during lunch and after school.

If intervention sessions are to be held outside of class time, i.e. lunch hour, the time it takes students to get from their classes and bring their lunches to the location of the intervention must be taken into consideration. Some students have to wait in line in the school cafeteria to purchase their lunches. Even though there was a 70-minute lunch hour in the school in which the study took place, each session was closer to 60 minutes in reality. The logistics of having students consume their lunch at the beginning of a session and then having them participate in some kind of physical activity mid-way through needs to be further examined. It is suggested that the intervention should not be held at lunch, but during regular class time.

This intervention involved lots of discussion and reflection. This poses a challenge for students for whom English is a second language. This could become a major barrier for schools located in "ethnic" areas where a lot of students do not speak English as a first language. It would be interesting to have questionnaires in multiple languages, i.e. English, French, Chinese, etc. and see if the effect of the language barrier can be reduced.

In terms of implementation, the issue of how to deliver one program to students at different stages of change must be resolved, since this type of behavioral intervention seems to have a higher impact on participants in the initial stages of change. The other option would be to develop a "two-tier" program for participants at different stages.

Effort must be placed on the re-structuring of the physical education curriculum that would allow the incorporation of behavioral skills with sport-specific skills in the

curriculum to foster the habit of life-long physical activity. Currently, only leadership skills and sport skills are most commonly emphasized (CFLRI, 2003).

It is the opinion of the researcher that such an intervention is realistic for schools. It will require effort, by the administrator, to create "block schedules" for Physical Education classes. This means that students can take their Physical Education class one module at a time with several modules to choose from. This intervention could become a mandatory module scheduled during regular class time for students. This would circumvent the lunch-hour distractions and ensure a longer duration of the intervention.

The study by Nigg and Courneya (1998) found that the distribution of high school students across the stages of change was approximately 2.1% in pre-contemplation, 4.2% in contemplation, 28.7% in preparation, 15% in action, and 49.3% in maintenance. Therefore, it is unrealistic to screen for pre-contemplators and contemplators only for an intervention because this would include only a small number of students. This certainly was the case for this study. Therefore, it is suggested that the intervention should be designed for students in the pre-contemplation, contemplation, and preparation stages. Students in the action and maintenance stages are not recommended because they are already meeting the standard set in the Canadian Physical Activity Guide and may intimidate those students in an earlier stage. Furthermore, it is not expected that students in the last two stages would choose to participate in this module as opposed to other modules that are more activity based.

Recommendations for Self as Counselor

At the beginning of this research project, the researcher set out to conduct a study on physical activity that would yield "real" results, results that would lead to "real

changes" in how people would conduct their lives immediately. The researcher was doing what Shank (2002) described as trying to "...convert the research efforts into crusades." (p. 186) At the beginning of the study, this caused the researcher to become particularly sensitive to only "desirable" observations in order to support anticipated findings. An important lesson learned in this process was that the researcher must remain un-biased in order to let the data lead to the findings, whether they were anticipated or not. A researcher must keep his/her eyes open for all observations, whether they are what the researcher wants to see or not.

The researcher had some training in quantitative analysis in the traditional scientific method but little training in qualitative methodology. This resulted in a fairly "rigid" mindset at the beginning of the study. The researcher tried to seek "answers" to questions asked and was unsure how to deal with the ambiguity of participants' responses at times. This may have led to a somewhat narrow interpretation of data collected, and significant or meaningful data from observations, field notes, and transcriptions generated from the study may have been initially overlooked. A sound understanding of qualitative methodology, from the conceptual framework to analysis of qualitative data, is a skill a researcher doing this type of intervention must possess.

Through conducting this study, I have learned to become a better "instrument" for making observations. I learned the importance of looking past the surface of behavior in order to search for the meanings behind. I learned to listen to the emotions, not just the content, of verbal responses so that I could better understand and interpret what constitutes the experiences of the students.

The researcher must be able to maintain objectivity throughout the intervention and be able to accept that the intervention might not elicit any behavioral change in some participants. The researcher became very emotionally involved and experienced a lot of "self-blame" and self-doubt because there was only limited change in some of the participants. In retrospect, it was too much to expect to overturn a lifetime of physical activity habit in eight short intervention sessions.

Recommendations for Further Research

Future interventions should definitely include goal setting and the teaching of goal setting skills as a major component. The intervention should run longer (e.g. 10 to 12 sessions) to allow a full and complete discussion to occur.

Prior to screening by the "stages of change questionnaire", the definition of physical activity should be introduced to the participants. There are several versions of the stages of change questionnaire. The one that was used in the study followed a "flow chart" format. A lot of students did not complete the questionnaire correctly because they were confused by this style of question presentation. Therefore, an alternative version of this questionnaire should be used. If that is not possible, the structure of the questionnaire must be clearly explained to the students to reduce confusion.

Perhaps a different instrument, one that is easier to understand and interpret, could also be used to measure exercise self-efficacy in future studies. Participants in the study, particularly those who were ESL, had great difficulty in rating their "confidence". They could not distinguish between reporting the confidence they had in doing something and what they actually did. Work should be carried out in the area of developing more objective, user-friendly measures for variables such as exercise self-efficacy and self-

schema. This would allow more comprehensive investigations on the relationship between exercise self-efficacy, exercise self-schema, and motivational changes.

This study involved a female researcher working with female students. It would be interesting to investigate the results of having a female researcher work with male students, and vise versa, under the same set of circumstances. It has been hypothesized that females are most interested in participating in studies on "feminine" topics such as mood and feelings, while males are most interested in studies on "masculine" topics, i.e. competition related (Basow, 1992). The question of whether this type of intervention, which focused on feelings, would work with male participants is worth exploring.

One of the difficulties the researcher encountered was not being able to record immediate impressions and observations in the field notes because she was conducting the intervention herself. It would have been better if a qualified facilitator had conducted the intervention while the researcher made observations. Due to the researcher's teaching schedule, she was not able to complete the field notes or reflect on the intervention sessions until after school, leading to the accuracy of the accounts being dependent on the researcher's ability to recall the details of the intervention sessions. This was a definite limitation of the study.

This study could be expanded into a large-scale study that involves all four high schools in the division. The intervention could be delivered over a twelve-week period through weekly meetings during class time. These sessions should be conducted by a trained facilitator (e.g. physical education teacher). Each weekly meeting would combine the learning of behavioral skills with at least 20 minutes of moderate physical activity

that is not a sport skill. There would be variations in the activity portion of the intervention sessions to maintain students' interest.

The stage of change questionnaire should be used only as a screening tool to recruit students in the pre-contemplation, contemplation, and preparation stages (instead of just pre-contemplators and contemplators) as originally planned.

The Modified Canada fitness survey, the exercise self-efficacy questionnaire, and exercise self-schema measure could be used as pretest/posttest measures. It is expected that the larger number of participants and the extended duration of the intervention, combined with an expert facilitator would yield statistically significant quantitative data and meaningful qualitative results.

## Conclusions

This study was designed to increase the amount of physical activity in inactive female high school students by increasing self-efficacy, self-schema, and behavioral skills such as goal-setting and self-monitoring, etc. A secondary purpose of the study was to investigate the feasibility of implementing such a program in a real high school setting.

The intervention was successful in increasing the amount of physical activity in the participants and seemed to enhance the participants' internal feelings of exercise self-efficacy. Bandura (1994) described successful efficacy interventions in terms of self-improvement. He recommended structuring situations for participants in ways that will bring success and avoid situations where participants will likely encounter failure. This was reflected in the study by the open-ended discussions (no right or wrong answers), the absence of competitive situations during physical activity (everyone was asked to be active for the same amount of time; distance and intensity and were not measured in any

way), and the teaching of behavioral skills (self-monitoring) that allowed participants to observe their own improvement.

The participants found the goal-setting worksheet to be most helpful by far. They identified goal setting and self-monitoring as the two behavioral skills that were most valuable for them to learn. Any worksheet that involved a lot of reading and/or writing (i.e. Inventory of lifestyle needs and activity preferences) was not welcomed by this group of participants. In general, the participants preferred to respond to questions verbally rather than in written form. The participants would have liked to experience a larger variety of physical activity and did not enjoy analyzing all the variables that might influence their participation in physical activity.

Biddle and Mutrie (2001) proposed four guidelines for an intervention based on sources of efficacy information: (1) It must include enjoyable and reinforcing physical activity to enhance individuals' perceptions of mastery and intrinsic motivation. (2) It should allow individuals to observe other individuals of similar build and ability "succeed" in exercise. (3) It should enhance personal perceptions of the costs and benefits of exercise. (4) It should provide individuals with physiological information in order for them to maintain an appropriate level of activity. The intervention used in this study attempted to meet these guidelines: (1) it included moderate intensity physical activity (walking) that was easy to do and "fail-safe", (2) it provided opportunities for participants to engage in the activity together so that they could observe each other completing the activity successfully, (3) it included theoretical information on benefits of physical activity, and (4) it allowed participants to adjust their levels of physical activity as they needed (went from walking to jogging).

Kendzierski (1988) pointed out that intervention strategies should aim to change non-exerciser schemas, to develop exercise schemas in those who are aschematic for exercise, and to help exerciser schematics to maintain their schemas. To some extent, the study achieved these goals. Some participants were transformed from being non-exerciser schematics to, at least, being aschematic for exercise behavior, or exerciser schematics. Participants described stronger perceptions of themselves as being active, indicating either emerging, or strengthening exercise self-schemas.

The use of the transtheoretical model was advantageous for helping progression through the stages of change. By using the stage of change questionnaire to screen participants into the study, the researcher was able to employ specific intervention strategies to meet the needs of the "at-risk" students (Carron et al., 2003). The use of stage-specific strategies and the proactive identification of "at-risk" students will lead to higher rate of participation in physical activity (Marcus et al., 2000). Advancement along the stages of change continuum was observed.

The quantitative data obtained did not achieve statistical significance due to the small sample size and large standard deviations. The number of recruited participants was smaller than expected. This lack of statistical significance was anticipated from the onset of the study.

Further studies of a similar nature should be implemented in schools having a physical education program that does not include behavioral components. The intervention should run the full length of the term/semester (10 weeks) and should be scheduled in regular class time. The activity components should include a variety of low-medium intensity activity, and there must be an indoor facility and equipment in

anticipation of adverse outdoor weather conditions. More focus should be placed on helping the students to develop behavioral skills instead of specific sport skills in order to promote life-long participation in physical activity.

Final thoughts

As of this writing, the researcher still has incidental/informal contact with the participants in the intervention. Mary has joined a fitness club with her whole family, which was consistent with her response during the intervention in the sense that she identified her family as the most helpful in getting and keeping her motivated to stay active. Chantal has kept up with her activity routine as well. The researcher recently participated in an aerobic exercise class with her during lunch hour during a regular school day.

Although the intervention did not result in statistically significant change in the participants' physical activity, exercise self-efficacy, and/or exercise self-schema due to the small sample size and other limitations of the study, it did produce practical changes in participants. These changes included increased amounts of physical activity and improved goal-setting skills. In conclusion, the study made three valuable contributions: (1) it attempted to investigate the existence of relationship between self-efficacy, self-schema, stage of change, and participation in physical activity, (2) it highlighted the need to move away from the "one-size-fits-all" approach to teaching physical education, and (3) it provided insights into the design and delivery of an alternative approach to teaching physical education in high school – one that focused on preparing students for life-long participation in physical activity.

**References**

Aron, A., & Aron, E. N. (1999). Statistics for psychology. Upper Saddle River, NJ: Prentice Hall.

Bandura, A. (1995). Guide for constructing self-efficacy scales. Stanford, CA: Stanford University.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), Encyclopedia of human behavior (Vol. 4, pp. 71-81). New York: Academic Press.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Basow, S. A. (1992). Gender: Stereotypes and roles. Pacific Grove, CA: Brooks/Cole.

Benner, P. (Ed.) (1994). Interpretive phenomenology: Embodiment, caring, and ethics in health and illness. Thousand Oaks, CA.: Sage.

Biddle, S., & Mutrie, N. (2001). Psychology of physical activity. Determinants, well-being and interventions. New York: Routledge.

Blair, S. N., La Monte, M. J., & Nichaman, M. Z. (2004). The evolution of physical activity recommendations: how much is enough? American Journal of Clinical Nutrition, 79 (suppl), 913S-920S.

Blair, S., Dunn, A., Marcus, B., Carpenter, R., & Jaret, P. (2001). Active living every day. Champaign, IL: Human Kinetics.

Buckworth, J. & Dishman, R. (2002). Exercise psychology. Champaign, IL: Human Kinetics.

CFLRI (Canadian Fitness and Lifestyle Research Institute) (2003). Increasing physical activity. Encouraging physical activity through school. Ottawa, ON: CFLRI.

CFLRI (Canadian Fitness and Lifestyle Research Institute) (2002). 2001 Physical activity monitor. Ottawa, ON: CFLRI.

CFLRI (Canadian Fitness and Lifestyle Research Institute) (1988). Campbell's survey on well-being in Canada. Ottawa, ON: CFLRI.

Canadian Society for Exercise Physiology. (1997). The Canadian physical activity, fitness & lifestyle appraisal. Ottawa, ON: CSEP.

Carron, A., Hausenblas, H., & Estabrooks, P. (2003). The psychology of physical activity. St. Louis, MO: McGraw Hill.

Denzin, N. K., & Lincoln, Y. S. (Eds.) (1994). Handbook of qualitative research. Thousand Oaks, CA: Sage.

Fiske, S., & Taylor, S. E. (1984). Social cognition. Reading, MA: Addison-Wesley.

Flick, U. (2002). An introduction to qualitative research. Thousand Oaks, CA: SAGE.

Folsom, A. R., Caspersen, C. J., Taylor, H. L., Jacobs, Jr. D. R., Luepker, R. V., Gomez-Marin, O., et al. (1985). Leisure time physical activity and its relationship to coronary risk factors in a population-based sample: The Minnesota Heart Survey. American Journal of Epidemiology, 121. 570-579.

Graziano, A. & Raulin, M. (2000). Research methods. A process of inquiry. Boston: Allyn and Bacon.

Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. American Psychologist, 35, 603-618.

Jackson, A. W., Morrow, J. R., Hill, D. W., & Dishman, R. K. (2004). Physical activity for health and fitness. Champaign, IL: Human Kinetics.

Kendzierski, D. (1994). Schema theory: an information processing focus. In R. Dishman (Ed.). Advances in exercise adherence (pp.137-159). Champaign, IL: Human Kinetics.

Kendzierski, D. (1990). Exercise self-schemata: Cognitive and behavioral correlates. Health Psychology, 9(1), 69-82.

Kendzierski, D. (1988). Self-schemata and exercise. Basic and Applied Social Psychology, 9(1), 45-59.

Kendzierski, D., & Whitaker, D. J. (1997). The role of self-schema in linking intentions with behavior. Journal of Personality and Social Psychology Bulletin, 23, 139-147.

Leon, A. S., Connett, J., Jacobs Jr. D. R., & Rauramaa, R. (1982). Leisure time physical activity levels and risk of coronary heart disease and death: the Multiple Risk Factor Intervention Trial. Journal of American Medical Association, 258. 2388-2395.

Maddux, J. E. (1995). Self-efficacy, adaptation, and adjustment. Theory, research, and application. New York: Plenum Press.

Marcus, H., & Forsyth, L. (2003). Motivating people to be physically active. Champaign, IL: Human Kinetics.

Marcus, B. H., Dubbert, P. M., Forsyth, L. H., McKenzie, T. L., Stone, E. J., Dunn, A. L., & Blair, S. N. (2000). Physical activity behavior change: Issues in adoption and maintenance. Health Psychology, 19, 32-41.

Marcus, B. H., Banspach, S. W., Lefebvre, J. S., Rossi, R., Carleton, R. A., & Abrams, D. B. (1992). Using the stages of change model to increase the adoption of physical activity among community participants. American Journal of Health Promotion, 6, 424-429.

Markus, H. (1977). Self-schemata and processing information about the self. Journal of Personality and Social Psychology. 35, 63-78.

Markus, H., & Smith, J. (1981). The influence of self-schema on the perception of others. In N. Cantor & J. F. Kihlstrom (Eds.), Personality, cognition, and social interaction (pp. 233-260). Hillsdale, N.J.: Erlbaum.

Markus, M. & Wurf, E. (1987). The dynamic self-concept: A social psychological perspective. Annual Review of Psychology, 38, 299-337.

Martin, G. (2003). Sport psychology. Practical guidelines from behavior analysis. Winnipeg, MB: Sport Science Press.

McAuley, E. (1992). Self-referent thought in sport and physical activity. In T. S. Horn (Ed.). Advances in sport psychology. (pp.101-118). Champaign, IL: Human Kinetics.

Montoye, J. H., Kemper, H. C., Saris, W. H., & Washburn, R. A. (1996). Measuring physical activity and energy expenditure. Champaign, IL: Human Kinetics.

Nigg, C. R., & Courneya, K. S. (1998). Transtheoretical model: Examining adolescent exercise behavior. Journal of Adolescent Health, 22, 214-224.

Prochaska, J. O., & DiClemente, C. C. (1983). The stages and processes of self-change in smoking: Towards an integrative model of change. Journal of Consulting and Clinical Psychology, 51, 390-395.

Project GRAD. (Graduate Ready for Activity Daily) (1994). San Diego: San Diego Stage University.

Renner, B., & Schwarzer, R. (2003). Applied fields: Health. In R. Fernández-Ballesteros (Ed.), The encyclopedia of psychological assessment (Vol. 1, pp. 69-72). Thousand Oaks, CA: Sage.

Rossman, G. B. & Rallis, S. F. (2003). Learning in the field: An approach to qualitative research. Thousand Oaks, CA: Sage.

Sallis, J., & Owen, N. (1999). Physical activity & behavioral medicine. Thousand Oaks, CA: Sage.

Shank, G. D. (2002). Qualitative research: A personal skills approach. Columbus, OH: Merrill Prentice Hall.

Shin, Y., Jang, H., & Pender, N. J. (2001). Psychometric evaluation of the exercise self-efficacy scale among Korean adults with chronic diseases. Research in Nursing & Health, 24, 68-76.

U. S. Department of Health and Human Services. (1996). Physical activity and health. A report of the Surgeon General. Atlanta, GA: U. S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

Trost, S. G., Owen, N., Bauman, A. E., Sallis, J. F., & Brown, W. (2002). Correlates of adults' participation in physical activity: review and update. Medicine & Science in Sports & Exercise,34, 1996-2001.

U.K. Department of Health (2004). At least five a week. Evidence on the impact of physical activity and its relationship to health. London: U.K. Department of Health.

Van Manen, M. (1990). Researching lived experiences: Human science for an action sensitive pedagogy. Landon, ON: Althouses Press.

# Appendix A

A1- Letter of permission from superintendent

A2 – Letter of permission from principal

## 1. Letter of Approval from Superintendent

PEMBINA TRAILS SCHOOL DIVISION

May 3, 2005

Catherine Birch
Fort Richmond Collegiate
99 Killarney Avenue
Winnipeg, MB
R3T 3B3

Dear Catherine,

I was pleased to receive your request for approval of your Masters of Science thesis. This looks like a very interesting and useful topic, and I would enjoy meeting with you after it is completed to discuss your findings and the ramifications for how we program and think about physical activity.

Approval is granted. Best wishes as you work towards completing your Masters.

Regards,

Graham Bruce
Assistant Superintendent - Program

181 Henlow Bay Winnipeg MB R3Y 1M7 Canada www.pembinatrails.ca Phone (204) 488-1757 Fax (204) 488-2095

2. Letter of permission from principal

To: Catherine Birch
Principal Investigator

From: Lorraine Carter
Principal, Fort Richmond Collegiate

**Re: Request for Approval of Masters of Science thesis**
***"Alternative Physical Activity Program for High School Students"***

---

Dear Mrs. Birch:

Thank you for your Request for Approval, dated April 24, 2005. I have reviewed your request and can advise that I support your research endeavour titled "Alternative Physical Activity Program for High School Students".

I look forward to receiving a copy of the report once completed.

Sincerely.

Mrs. Lorraine Carter
Principal

# Appendix B

Stages of Change Questionnaire (Blair et. al, 2001)

**Stage of Change Questionnaire (Blair et al, 2001)**

## Assessing Stage of Change for Physical Activity

Are you accumulating at least 30 minutes of moderate-intensity* physical activity on at least 5 days of the week?

No — Yes

Are you doing some moderate intensity physical activity once in a while?

No — Yes

Do you intend to increase your physical activity?

No — Yes

You are in the **Precontemplation Stage** (Stop: This is your stage)

You are in the **Contemplation Stage**

You are in the **Preparation Stage** (Stop: This is your stage)

Have you been doing this on a regular basis for the last 6 months?

No — Yes

You are in the **Action Stage** (Stop: This is your stage)

You are in the **Maintenance Stage** (Stop: This is your stage)

* Moderate intensity physical activities are equal in effort to a brisk walk.

This assessment tool was modified from the Cooper Institute, Dallas, Texas.

## Appendix C

C-1- Informed consent form for participants

C-2 – Parental consent form

C-3 – Ethics board approval certificate

## 1. Informed Consent – April 2005

Research Project Title: Alternative Physical Activity Program for High School Students
Researcher: Catherine Birch

This study is conducted as part of the requirement for completion of a Master of Science degree in the Faculty of Physical Education & Recreational Studies at the University of Manitoba.

This consent form, a copy of which will be left with you, should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully.

**Description of Research**

A physical activity program for female high school students is being piloted in your school. The main purpose of this program is to provide an alternative to part of your physical education classes, and to help you to participate in physical activity.

Female students enrolled in the mandatory physical education credit course (0167) who volunteer for this study will attend a brief interview and the pre-test session where you will be asked to complete four questionnaires. It is estimated that it will take approximately 30 minutes of your time in total. This will be followed by eight weekly 70-minute sessions and a post-test session where you will be asked to complete the same four questionnaires that were completed in the pre-test session. The 10 sessions will replace 10 regular physical education classes, attendance will be recorded and attendance credit will be given.

The researcher of the study, who teaches at your school, is completing the project as part of her Master's program. None of the participants is enrolled in any courses taught by the researcher. Each session will consist of sharing, goal setting, and discussion, with approximately 10 to 20 minute of moderate physical activity. The researcher will take notes on these discussions to form part of the qualitative description of the study. The program will take place in a regular classroom (discussion), indoor track, and the outdoors (physical activity) until the end of school year (prior to final exams).

At the end of the program, you will be asked to complete the post-test measures. The researcher will also ask several questions to determine how you felt about the program. You are free to withdraw from the program at any time and return to your regular physical education class. You do not have to answer any question that you do not wish to, and you should feel free to ask for help with any question that you do not understand. The data recorded in the study will be kept until the defense of the thesis is completed (June, 2006), and will be destroyed after.

- There are no risks to you by taking part in the research.
- The author of this study will make the final report available to you, if you wish to see it.

- Participant numbers, not names, will be recorded on the questionnaires. Your responses to the questionnaires will be kept anonymous and confidential. The key for the participant numbers will be kept in a separate locked file at the researcher's residence.
- No compensation will be provided.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Principal researcher: Catherine Birch
Research advisor: Dr. Janice Butcher

This research has been approved by the Education/Nursing Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

_____

Participant's Signature Date

_____

Researcher's Signature Date

If you would like to receive a copy of the final report, please tear off the form below:

---

I would like to receive a copy of the report on Alternative Physical Activity Program For High School Students.

Name:_____

Address:_____

Postal Code: _____

## 2. Parental Consent – April 2005

Dear Parent or Guardian:

We would like to ask your permission for your daughter to participate in the following study:

Research Project Title: Alternative Physical Activity Program for High School Students
Researcher: Catherine Birch

This study is conducted as part of the requirement for completion of a Master of Science degree in the Faculty of Physical Education & Recreational Studies at the University of Manitoba.

**Description of Research**

A physical activity program for female high school students is being piloted in your daughter's school. The main purpose of this program is to provide an alternative to part of your daughter's physical education classes, and to help her to participate in physical activity.

Female students enrolled in the mandatory physical education credit course (0167) who volunteer for this study will attend a brief interview and the pre-test session where they will be asked to complete four questionnaires. It is estimated that it will take approximately 30 minutes of her time in total. This will be followed by eight weekly 70-minute sessions and a post-test session where they will be asked to complete the same four questionnaires that were completed in the pre-test session. The 10 intervention sessions will replace 10 regular physical education classes, attendance will be recorded and attendance credit will be given.

The researcher of the study, who teaches at your daughter's school, is completing the project as part of her Master's program. None of the participants is enrolled in any courses taught by the researcher. Each session will consist of sharing, goal setting, and discussion, with approximately 10 to 20 minute of moderate physical activity. The researcher will take notes on these discussions to form part of the qualitative description of the study. The program will take place in a regular classroom (discussion), indoor track, and the outdoors (physical activity) until the end of school year (prior to final exams).

At the end of the program, the participants will complete the post-test measures. The researcher will also ask several questions to determine how the participants felt about the program. Your daughter is free to withdraw from the program at any time and return to her regular physical education class. She does not have to answer any question that she does not wish to, and she should feel free to ask for help with any question that she does not understand. The data recorded in the study will be kept until the defense of the thesis is completed (June, 2006), and will be destroyed after.

- There are no risks to your daughter by taking part in the research.

- The author of this study will make the final report available to you, if you wish to see it.
- Participant numbers, not names, will be recorded on the questionnaires. Your daughter's responses to the questionnaires will be kept anonymous and confidential. The key for the participant numbers will be kept in a separate locked file at the researcher's residence.
- No compensation will be provided.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to give consent for your daughter to participate in the study described above. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. Your daughter is free to withdraw from the study at any time, and /or refrain from answering any questions she prefers to omit, without prejudice or consequence. Her continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your daughter's participation.

Thank you for your consideration.

Sincerely,

Principal researcher: Catherine Birch
Research advisor: Dr. Janice Butcher

This research has been approved by the Education/Nursing Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

_____

Parent / Guardian's Signature Date

_____

Researcher's Signature Date

If you would like to receive a copy of the final report, please tear off the form below:

_____

I would like to receive a copy of the report on Alternative Physical Activity Program For High School Students.

Name:_____

Address:_____

Postal Code: _____

**Please send this form back to school with your daughter by**

**_____. Thanks!!!**

## 3. Ethics board approval certificate

UNIVERSITY OF MANITOBA

OFFICE OF THE VICE-PRESIDENT (RESEARCH)

207 Administration Building
Winnipeg, Manitoba
Canada R3T 2N2
Telephone (204) 474-6915
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www.umanitoba.ca/vpresearch

**APPROVAL CERTIFICATE**

28 April 2005

**TO:** **Catherine Birch** (Advisor J. Butcher)
Principal Investigator

**FROM:** **Stan Straw, Chair**
Education/Nursing Research Ethics Board (ENREB)

**Re:** **Protocol #E2005:032**
**"Alternative Physical Activity Program for High School Students"**

Please be advised that your above-referenced protocol has received human ethics approval by the **Education/Nursing Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

**Please note that, if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

*Get to know Research...at your University.*

# Appendix D

Pre-test/Post-test Measures

D-1 Modified Canadian fitness survey

D-2 Exercise self-efficacy scale

D-3 Exercise self-schema scale

## 1. Modified Canada Fitness Survey (Campbell, 1988)

### Physical Activity in Your Spare Time

Please indicate whether you have done each activity listed below. Then for those activities which you have done, please complete the number of times done each week, and the average time spent on each occasion (not counting travel time, changing etc.).

| | | | Number of times each week (F) | | | | Average time Per occasion | | Total (F x T) |
|---|---|---|---|---|---|---|---|---|---|
| Activity | No | Yes | wk1 | wk2 | wk3 | wk4 | hrs. | min. | |
| Walking for exercise | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Bicycling | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Jogging/running | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Home exercise | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Exercise class (i.e. aerobics) | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Ice skating | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Cross-country skiing | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Downhill skiing | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Ice hockey | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Swimming | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Gardening, yard work | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Golf | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Tennis | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Weight training | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Baseball, softball | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Popular/social dances | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Ballet, modern, or jazz dance | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Square/folk dance | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Bowling | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Curling | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| Other | | | | | | | | | |
| _____ | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| _____ | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | _____ |
| _____ | ☐ | ☐ | ____ | ____ | ____ | ____ | ____ | ____ | ____ |

## 2. Exercise Self-efficacy Scale (Shin et al, 2001)

For numbers 1 – 18 you should rate **HOW CONFIDENT** you are that you could **PERFORM EXERCISE ROUTINES REGULARLY (THREE OR MORE TIMES A WEEK)** in each situation.

Please rate from 0 to 100 the number that best describes your feelings of **CONFIDENCE TO PERFORM EXERCISE ROUTINES** in each situation according to the following scale:

1. When I am feeling tired.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| cannot do | | | | moderately certain can do | | | | | | certain can do |

2. When I am feeling under pressure from work.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

3. During bad weather.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

4. After recovering from an injury that caused me to stop exercising.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

5. During or after experiencing personal problems.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

6. When I am feeling depressed.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

7. When I am feeling anxious.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

8. After recovering from an illness that caused me to stop exercising.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

9. When I feel physical discomfort when I exercise.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

10. After a vacation.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

11. When I have too much work to do at home.

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

12. When visitors are present.

0 10 20 30 40 50 60 70 80 90 100

13. When there are other interesting things to do.

0 10 20 30 40 50 60 70 80 90 100

14. If I don't reach my exercise goals.

0 10 20 30 40 50 60 70 80 90 100

15. Without support from my family or friends.

0 10 20 30 40 50 60 70 80 90 100

16. During a vacation.

0 10 20 30 40 50 60 70 80 90 100

17. When I have other time commitments.

0 10 20 30 40 50 60 70 80 90 100

18. After experiencing family problems.

0 10 20 30 40 50 60 70 80 90 100

**Items 1, 2, 3, 5, 6, 7, 9 provide scores for "internal feelings" category.**

**Items 4, 8, 10,14, 15 provide scores for "competing demands" category.**

**Items 11, 12, 13, 16, 17, 18 provide scores for "situational" category.**

## 3. Exercise Self-Schema Measure

**Part I**

For each of the following descriptor phrases, indicate on the scale to what extend each of them describes you. (1 = does not describe me; 11 = describes me)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| does not describe me | | | | | | | | | | describes me |

1. Someone who is spontaneous. _____
2. Someone who is out-going. _____
3. Someone who exercise regularly.* _____
4. Someone who is introverted. _____
5. Someone who is friendly. _____
6. Someone who is physically active.* _____
7. Someone who is socially active. _____
8. Someone who is energetic. _____
9. Someone who keeps in shape.* _____
10. Someone who looks after oneself. _____

**Part II**

For each of the following descriptor phrases, indicate on the scale how important each descriptor phrase is to the image you have of yourself, **regardless of whether or not the trait describes you**. (1 = not at all important; 11 = very important)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| not at all important | | | | | | | | | | very important |

1. Someone who is spontaneous. _____
2. Someone who is out-going. _____
3. Someone who exercise regularly.* _____
4. Someone who is introverted. _____
5. Someone who is friendly. _____
6. Someone who is physically active. * _____
7. Someone who is socially active. _____
8. Someone who is energetic. _____
9. Someone who keeps in shape.* _____
10. Someone who looks after oneself. _____

*** Items scored for exercise self-schema**

## Appendix E

Attendance record for intervention

Table 8

Attendance Record for Intervention

| respondent | Intervention | | | | | | | | | Posttest |
|---|---|---|---|---|---|---|---|---|---|---|
| | Initial meeting | Session 1 (raising awareness) | Session 2 (past experiences) | Session 3 (finding motivation) | Session 4 (Enjoyment/ rewards) | Session 5 (relapse & prevention) | Session 6 (progress check) | Session 7 (other options) | Session 8 (goal setting) | |
| Mary | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rita | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Tara | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | X | ✓ | ✓ | ✓ |
| Chantal | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Lucy◈ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Debby◈ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | X | ✓ | ✓ | ✓ |
| Faye | ✓ | ✓* | ✓* | ✓ | X | ✓# | X | ✓ | ✓ | ✓ |
| Grace | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Jamie◈ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Total number | 9 | 9 | 9 | 9 | 8 | 9 | 6 | 9 | 9 | 9 |

✓ present

X absent

* student did not participate in activity portion

\# student participated in alternative activity

◈ student joined later

## Appendix F

Intervention worksheets

F-1 Weekly activity goal sheet

F-2 Physical activity history worksheet

F-3 Enjoyment worksheet

F-4 Inventory of lifestyle needs and activity preferences

F-5 Goals and rewards

F-6 Relapse planner

F-7 Activity alert

F-8 Physical activity in my community work sheet

F-9 Contract of behavior change

## 1. WEEKLY ACTIVITY GOAL SHEET

Activity Goals for the Week of _____

**A. What I Plan to Do (Goal-setting)**

| What activity | Where | When | How long | With whom |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**B. What I Actually Did (Self-monitoring)**

| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| What I did | | | | | | | |
| How long | | | | | | | |
| With whom | | | | | | | |

## 2. Physical Activity History Worksheet

**(Questions 1 to 3 from Motivating People to be Physically Active, by Marcus, and Forsyth, 2003)**
**(Questions 4 from Physical Activity for Health and Fitness by Jackson et al., 2004)**

### Physical Activity History

1. Were there ever times when you were physically active regularly for at least 3 months?

   a. Yes b. No

   If yes, what kind of activities were you involved in?

2. If you are no longer involved in the activities listed, why did you stop your activity?
   **Lack of time due to**

   ___ work or school ___ lack of physical activity partner

   ___ household duties ___ lack of interest in physical activity

   ___ health problems ___ social activities

   ___ injury ___ season or weather change

   ___ lack of money ___ personal stress

   ___ lack of facilities ___ other: _____

3. Can you recall any incidents/experiences in your past that cause you to view physical activity as something that is negative?

   a. Yes b. NO

   If yes, please elaborate. _____

4. List the things that bother you about yourself.

   Specific physical problem: _____

   Appearance of particular part of body: _____

   Ability to play a specific sport: _____

   Risk of a health problem: _____

   Other: _____

## 3. Inventory of Lifestyle Needs and Activity Preferences (CSEP, 1997)

*I feel it is important to me to ...*

- ☐ like the people I'm with
- ☐ be in a group
- ☐ be independent
- ☐ get to know other people well
- ☐ meet many new people
- ☐ be a leader
- ☐ feel confident
- ☐ learn something
- ☐ be in pleasant, attractive surroundings
- ☐ be alone
- ☐ have a structured activity
- ☐ be able to do things at the last minute
- ☐ follow rules
- ☐ be praised
- ☐ have fun and enjoy myself
- ☐ release frustration
- ☐ take a risk
- ☐ enjoy the outdoors
- ☐ release energy
- ☐ improve my health
- ☐ have common interests with other people
- ☐ be able to contribute something to a group
- ☐ have other people like me
- ☐ be physically active
- ☐ use my imagination
- ☐ create something
- ☐ find the activity challenging
- ☐ feel safe and secure
- ☐ try something new and different
- ☐ be myself
- ☐ use my talents
- ☐ improve myself and my skills
- ☐ accomplish something
- ☐ relax
- ☐ spend time with my family.

Once you have checked the lifestyle needs that are important to you, list the *three* most important and identify which activities would most probably satisfy these needs.

| Lifestyle Needs | Activity Preferences |
|---|---|
| 1. _____ | _____<br>_____<br>_____<br>_____<br>_____ |
| 2. _____ | _____<br>_____<br>_____<br>_____<br>_____ |
| 3. _____ | _____<br>_____<br>_____<br>_____<br>_____ |

**4. Enjoyment Worksheet (Project Grad, 1994)**

Name: _____ Date: _____

I. Activity: _____ ☹ 😐 ☺

Current Enjoyment (on a scale of 1-5): 1 2 3 4 5

Things I can do to increase my enjoyment:

1. _____

2. _____

3. _____

II. Activity: _____ ☹ 😐 ☺

Current Enjoyment (on a scale of 1-5): 1 2 3 4 5

Things I can do to increase my enjoyment:

1. _____

2. _____

3. _____

III. Activity: _____ ☹ 😐 ☺

Current Enjoyment (on a scale of 1-5): 1 2 3 4 5

Things I can do to increase my enjoyment:

1. _____

2. _____

3. _____

**5. Goals and Rewards (Blair et al., 2001)**

**Rewards**: When you accomplish something, celebrate! Rewards should be things that are meaningful to you. They can be material items like books, music, games, vacations, or even money. Any they can be simple things such as quite time for yourself.

Start by identifying exactly what you want to accomplish. Include completing dates and desired level of performance. A specific goal statement would be, "At the end of this month, I will have gone to two new parks or trails where I can walk or ride my bike."

| **Short-term Goals (less than one month)**<br>e.g. By Monday of next week I will have walked for 20 min. on my lunch hour at least four days (Mon, Tue, Wed, Fri.) | **Rewards**<br>Go watch a movie with a friend. |
|---|---|
| Goal 1: _____ | _____ |
| Goal 2: _____ | _____ |
| Goal 3: _____ | _____ |

| **Long-term Goals (one month or longer)**<br>e.g. Within the next three months I will have walked at least 20 miles. | **Rewards**<br>Buy my favorite music CD/DVD. |
|---|---|
| Goal 1: _____ | _____ |
| Goal 2: _____ | _____ |
| Goal 3: _____ | _____ |

**Post this where you will see it often (for example, in your daily calendar, in your locker, on your bathroom mirror).**

# 6. Relapse planner (CSEP, 1997)

How confident are you that you'll keep up your physical activity during the next three months?

- Not confident at all ☐ 1
- Not very confident ☐ 2
- Somewhat confident ☐ 3
- Confident ☐ 4
- Very confident ☐ 5

If your score was less than 4, complete the following exercise:

*Many people have periods of inactivity. Sometimes these breaks can last for just a few days and sometimes a few years. Planning ahead for the 'tough' times may help you stay active.*

1. Have you ever had trouble keeping your physical activity going before? If so, write down the reasons why.

_____

_____

_____

2. If you have had trouble, what has helped you get back on track? (e.g., support from friends, joining a class, setting goals)

_____

_____

3. What situations do you think would make it tough to keep up your physical activity routine? How will you handle these situations to increase your chances of being successful?

| High-Risk Situations | Solution(s) |
|---|---|
| *e.g., people at work asking me to go for drinks after work (my usual workout time)* | *1) tell everyone my regular workout schedule so they will consider it when they are choosing a time, 2) join them later, 3) schedule a make up time every week to cope with any unplanned changes* |
| | |
| | |
| | |
| | |

4. What will help you get started again if you do have a 'break'? Write down your ideas.

| Start-up Strategies |
|---|
| |
| |
| |
| |

**7. Activity Alert (Blair et al., 2001)**

Activity Alert :To be ready for any obstacles that may come along, take a few minutes to answer some questions.

1. Have you ever stopped being active for a week or more in the past?

_____

_____

2. What caused you to stop?

_____

_____

3. What did you do to get started again?

_____

_____

4. What obstacles are likely to be a problem for you now?

_____

_____

5. What can you do to prepare for those obstacles?

_____

_____

6. What will help you get back on track if you stop being active?

_____

_____

If you run into trouble in the future, look back at your answers. They could encourage you to get moving again. Meanwhile, keep up the good work, and enjoy the many benefits of an active life!

## 8. Physical Activity in my community worksheet

(some may not be applicable)

| I. Individual Activities | | |
|---|---|---|
| | Location | Cost |
| Indoor facilities | | |
| Tracks - walk/run | | |
| Stationary bikes | | |
| Treadmills | | |
| Stair climbers | | |
| Weight lifting equipment | | |
| Swimming pool | | |
| Other | | |
| Outdoor facilities | | |
| Walking/ jogging | | |
| Cycling paths | | |
| Rollerblading | | |
| Cross country skiing | | |
| Ice skating | | |
| Other | | |
| Programs / Instruction | | |
| Aerobics classes | | |
| Running club | | |
| Cycling club | | |
| Martial arts | | |
| Dance | | |
| Other | | |
| Parks and Recreation Dept. programs | | |
| School Continuing Ed. programs | | |
| | | |
| **II. Sport Activities** | | |
| | | |
| Facilities to Use on Own | | |
| Tennis courts | | |
| Racquetball courts | | |
| Squash courts | | |
| Badminton courts | | |
| Golf courses | | |
| Bowling lanes | | |
| Other | | |
| Organized Leagues/Programs | | |
| Slow pitch fastball | | |
| Soccer | | |
| Volleyball | | |
| Basketball | | |
| Ringette | | |
| Ice hockey | | |
| Curling | | |
| Other | | |

# 9. Contract for Behavior Change (CSEP, 1997)

Your next step in creating a successful behavior change program is to complete and sign a behavior change contract. Your contract should include details of your program and indicate your commitment to changing your behavior. Use the information from previous activities in this workbook to complete the following contract. (If your target behavior relates to exercise, you may want to use the program plan and contract for a fitness program in Lab 7-1.)

1. I _____ (name) agree to _____ (specify behavior you want to change)

   _____

2. I will begin on _____ (start date) and plan to reach my goal of _____ (specify final goal)

   _____ by _____ (final target date)

3. To reach my final goal, I have devised the following schedule of mini-goals. For each step in my program, I will give myself the reward listed.

| | | |
|---|---|---|
| _____ (mini-goal 1) | _____ (target date) | _____ (reward) |
| _____ (mini-goal 2) | _____ (target date) | _____ (reward) |
| _____ (mini-goal 3) | _____ (target date) | _____ (reward) |
| _____ (mini-goal 4) | _____ (target date) | _____ (reward) |
| _____ (mini-goal 5) | _____ (target date) | _____ (reward) |

   My overall reward for reaching my final goal will be _____

4. I have gathered and analyzed data on my target behavior and have identified the following strategies for changing my behavior: _____

   _____

   _____

5. I will use the following tools to monitor my progress toward reaching my final goal:

   _____
   (list any charts, graphs, or journals you plan to use)

   _____

   I sign this contract as an indication of my personal commitment to reach my goal.

   _____ (your signature) _____ (date)

   I have recruited a helper who will witness my contract and _____

   _____
   (list any way in which your helper will participate in your program)

   _____ (witness's signature) _____ (date)

**Appendix G**

1. Sample goal sheet from Session 2
2. Sample goal sheet from Session 7

## 1. Sample Goal sheet – April (Tara)

### A. What I Plan to Do (Goal-setting)

| What activity | Where | When | How long | With whom |
|---|---|---|---|---|
| Dance | Youth center | Friday | 1.5 hours | People I know there |
| Soccer | Whenever it is | Whatever day of this week | 1.5 hours | Teammates |
| Walking | To friend's house and back to school | Monday to Friday | 30minutes (x 5 days) | Friends |
| Running | Wherever my soccer is | Whatever day of this week | 1.5 hours (not constantly) | Teammates |

### B. What I Actually Did (Self-monitoring)

| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| What I did | -Walk to friend's house<br>- sit-ups | - Walk to friend's house | | | -Dance<br>- Soccer | | |
| How long | -10-15 min.<br>- 10 min. | 10-15 min. | | | 1.5 – 2.0 hours | | |
| With whom | Friends | Friend | | | teammates | | |

## 2. Sample Goal sheet – June (Tara)

### A. What I Plan to Do (Goal-setting)

| What activity | Where | When | How long | With whom |
|---|---|---|---|---|
| Walking | To and from school | Weekdays | 1 hour | friends |
| | | | | |
| | | | | |
| | | | | |

### B. What I Actually Did (Self-monitoring)

| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| What I did | Walk to school and back | Walk to school and back | Walk to school and back | Walk to school and back | Walk to school and back | | |
| How long | 1 hour | 45 min. | 45 min. | 45 min. | 1 hour | | |
| With whom | Friends | Friends | Friends | Friends | Friends | | |

**Appendix H**

Journal entries for Session 6

## Journal entries for Session 6

**Mary**

"The first time we met, I was kind of looking forward to goal-setting, becoming more active, having fun, etc. I think it is going pretty good for me personally, but the environment doesn't seem to be. What I mean by this is that, not everyone seems to be emitting positive rays about this "lunch-hour operation 101" thing. I personally feel that it has an impact on me. If some people around me don't want to share their ideas, I sometimes feel like holding back, but I tried my best to share.

I think the physical aspect of it helped me. I now realize the importance of physical fitness. It has also helped me in my gym classes tremendously. I don't feel shy if I am the slowest, or if I am not doing it as well as everyone else. I also do physically active things with my family. Goal-setting on paper, I think, is a realty good idea, because every time I look at it, I became more motivated to go out and do whatever activity I have set goals for. I have set goals (relating to physical fitness) and never reached them, because I think they were verbal goals. Now that I write them down, and am able to accomplish them, it also made me feel good about me, since I am attempting to be physically active."

**Rita**

"I don't know why I go to this class, I just know the teacher asked me to come. But I didn't choose the wrong way. I can learn something from this class. I knew more new people, and I had much time to get along with my friend, I can learn more things about physical education and new words. I feel very happy in this class, I think the teacher is so funny. She made me smile more and taught me many things."

**Chantal**

"I really enjoyed this class. It was a great alternative to regular gym class. I really enjoyed being able to go home for the afternoon. It was a great experience to meet new people and find out more about them. It was fun. Some benefits I got were to go home early (on Fridays), to meet new people, and to have a fun time."

**Lucy**

"This class has been a positive influence on me about being physically active. It has taught me to plan goals and try my best to accomplish them. Encouragement and even just talking and planning has shown me to know that there is time during the week for me to become physically active. Also, it has shown me to encourage family members to do the same. So, all in all this class was really good and yes, I still plan to finish it."

**Grace**

"I feel that this (these) little meetings taught me more about being physically active. Now I know that physically active is something that not only contains sports but it can be done without you conscientiously knowing it. These little meetings during Friday's lunch have made me more aware of being physically active and its benefits. Now I know that being physically active is really, really easy. The only thing I don't like about these meetings is that it is more theoretical that I thought before I came to the research group, I would rather be more physically active like doing some fun stuffs than sitting in a classroom talking about how we feel."

**Jamie**

"At the beginning of the program I had a lot of pressure that I had to do what I wrote for my goal. So that pressure helped me to do more exercise than I experienced before. However, in the middle of this program, it became harder to achieve my goal because for my exercise got harder

as I do it more (I didn't want to make same goals every time). So I got lazy and didn't do it. I had a little bit of pressure to do it but I didn't care about it since it wasn't for marks (I did not care since it wouldn't be on my report card). As the time goes I forgot that I needed to exercise so I did not do it."

## Appendix I

Transcription of students' responses for Session 8

## Transcription of Participants' responses for Session 8

**Question 1: What have you gained by participating in this study?**

- I have gained the habit and knowledge to plan goals for each week, and attempted to complete or reach them.
- How easy is it to be active.
- I have gained the ability to set goals.
- I gained knowledge about physical activity and it made me become more physically active.
- I learned that being physically active is not hard, and you don't have to do sports.
- I have gained the ability to plan my goals ahead.
- Learned more about physical education, met new people, and learned more words.
- I gained a better sense of fitness and health.
- Everyday I have sports and my life is better, not so boring.

**Question 2: What is/are the biggest change(s) that has/have taken place for you?**

- To actually try and fit the activities in my schedule.
- I think about being active more.
- I have been working out more and trying to work out more.
- Being more active, which in turn gives me more energy. I also feel more okay to participate in gym class.
- I am more conscientious about when I am physically active.
- I have changed my planning goals and trying to achieve them.
- Not so tired.
- I have paid attention to how often I have been working out and for how long.

- I feel I became strong. I like sports, but I used to feel tired, but now I feel nice.

**Question 3: Do you feel any differently about participating in physical activities? How so?**

- No, I don't feel any different because I have always tried participating in any activities.
- Being physically active is not playing sports so I think I would participate in physical activities such as walking.
- No. (response given twice)
- Yes, I am not as self-conscious about participating in activities. I am more willing to try now.
- Yes, I feel more conscientious about them.
- Yes, in this class we don't need to do some activity.
- I feel the same as I usually do.
- Yes, not so tired.

**Question 4: What other support do you need to help maintain the progress that you have made?**

- Mostly encouragement, and friends that would join in with me.
- Someone who always remind me to do it.
- I need friends close by who can work out with me.
- Support from my family.
- People to tell me to do it (and maybe marks).
- I need friends to work with, or just someone to talk to while being active.
- Make a plan.
- I would like to know how to count calories.
- Nothing.

**Question 5: What was the most useful information you received from this program?**

- The goal sheets.
- Being physically active continuously.
- That if you start exercising on a regular basis, then you will start a habit.
- How important it is to be active.
- The most useful information is that being physically active is not hard.
- Nothing. (response given twice)
- Learned more about physical activity.
- Every week we have a goal and I need to finish a goal. First week, I was so tired. I am a lazy person, but I need to finish the goal, so last week, I finished all of them but I did not feel so tired after.

**Question 6: How confident do you feel about continuing to be physically active after the completion of this intervention?**

- My confident has changed, if I want to join something, then I will just go ahead.
- I would not have a lot of confident in me.
- I feel confident. (response given twice)
- Very confident. It is like a routine now. Although I am not following my plan right now because of exams.
- I may/will continue to do it after this program.
- I kind of feel confident. I might become lazy over the summer.
- Reinforcement.
- I feel very confident to continue.

**Question 7: Are you glad you agreed to participate in the intervention or do you wish you had stayed in your regular physical education class?**

- I rather have stayed in regular gym class because there was something I enjoyed in gym class.
- I am glad that I took part in this study.
- Yes and no.
- Yes! It is much better than gym class, because we are active as well as able to gain useful information.
- When I am tired that day, I am glad I had agreed to join this program. I also wished I had stayed in my gym class sometimes, because it is fun sometimes.
- I enjoy this class by meeting new people.
- I wished I had stayed in my regular physical education class.
- I am glad because if I didn't, I would not get to know the people in the group with me.
- Yes.

**Question 8: What words would you use to describe yourself?**

- So-so, physically active, lazy
- Lazy
- Active, athletic
- Moderate, beginner
- Sometimes active, sometimes lazy
- Need motivation
- Good
- Confident, strong, oriented
- Stronger

Appendix J

I-1: Analysis of variance for amount of physical activity

I – 2: Analysis of variance for exercise self efficacy (internal feelings)

I-3: Analysis of variance for exercise self efficacy (competing demands)

1. Table 9

Analysis of Variance for Physical activity

| Respondent | Pretest | Posttest | Row Σ | Row M |
|---|---|---|---|---|
| Mary | 152.50 | 160 | 312.5 | 156.25 |
| Rita | 90.00 | 138.90 | 228.9 | 114.45 |
| Tara | 810.00 | 307.50 | 1117.5 | 558.75 |
| Chantal | 420.00 | 480.00 | 900 | 450 |
| Lucy | 285.00 | 415.00 | 700 | 350 |
| Debby | 861.30 | 1830.00 | 2691 | 1343.65 |
| Faye | 367.50 | 377.50 | 745 | 372.50 |
| Grace | 135.00 | 500.00 | 635 | 317.50 |
| Jamie | 55.00 | 137.50 | 192.50 | 96.25 |
| column Σ | 3176.30 | 4346.40 | | |
| M | 352.92 | 482.93 | GM = 417.92 | |

Squared deviations from grand mean

| Respondent | Pretest | | | | Posttest | | | |
|---|---|---|---|---|---|---|---|---|
| | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ |
| Mary | 70447.78 | 4225 | 68471.19 | 3751.56 | 66522.73 | 4226.3 | 68471.19 | 3752.79 |
| Rita | 107531.53 | 4225 | 92094.04 | 1644.30 | 77852.16 | 4226.3 | 92094.04 | 1645.11 |
| Tara | 153726.73 | 4225 | 19833.09 | 100014.06 | 12192.58 | 4226.3 | 19833.09 | 100020.39 |
| Chantal | 4.33 | 4225 | 1029.13 | 1225 | 3853.93 | 4226.3 | 1029.13 | 1225.70 |
| Lucy | 17667.73 | 4225 | 4613.13 | 0 | 8.53 | 4226.3 | 4613.13 | 0.0001 |
| Debby | 196319.87 | 4225 | 860404.66 | 175728.64 | 1993969.93 | 4226.3 | 860404.66 | 175971.86 |
| Faye | 2542.18 | 4225 | 2062.98 | 3600 | 1633.78 | 4226.3 | 2062.98 | 3601.20 |
| Grace | 80043.73 | 4225 | 10084.18 | 13806.25 | 6737.13 | 4226.3 | 10084.18 | 13803.9 |
| Jamie | 131710.93 | 4225 | 103471.59 | 564.06 | 78635.38 | 4226.3 | 103471.59 | 564.54 |
| Σ | 759994.81 | 38025 | 1162063.99 | 300333.87 | 2241406.15 | 38036.7 | 1162063.99 | 300585.49 |

| | $SS_{total}$ | $df_{total}$ | MS | F |
|---|---|---|---|---|
| Within | 3001400.96 | 18-1=17 | | |
| Column (between conditions) | 76061.7 | 2-1=1 | 76061.7 | 1.01 |
| Row (respondents) | 2324127.98 | 9-1=8 | | |
| Interaction (error) | 600919.36 | 17-1-8=8 | 75115.97 | |

(df 1,8, $p<0.05$):5.32

Steps followed as described in Aron and Aron (1999, p. 424-425)

2. Table 10

Analysis of Variance for Exercise Self-efficacy (Internal feelings)

| Respondent | Pretest | Posttest | Row Σ | Row M |
|---|---|---|---|---|
| Mary | 24.29 | 50 | 74.29 | 37.15 |
| Rita | 17.14 | 21.43 | 38.51 | 19.29 |
| Tara | 67.14 | 64.29 | 131.43 | 65.72 |
| Chantal | 54.29 | 42.85 | 97.14 | 48.57 |
| Lucy | 48.57 | 25.71 | 74.28 | 37.14 |
| Debby | 45.71 | 50 | 95.71 | 47.86 |
| Faye | 38.57 | 45.71 | 84.28 | 42.14 |
| Grace | 54.29 | 54.29 | 108.58 | 54.29 |
| Jamie | 20 | 68.57 | 88.57 | 44.29 |
| column Σ | 370 | 422.85 | | |
| M | 41.11 | 46.98 | GM = 44.05 | |

Squared deviations from grand mean

| Respondent | Pretest | | | | Posttest | | | |
|---|---|---|---|---|---|---|---|---|
| | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ |
| Mary | 390.46 | 8.64 | 47.61 | 98.41 | 48.30 | 8.58 | 47.61 | 119.46 |
| Rita | 724.15 | 8.64 | 613.06 | 0.63 | 511.66 | 8.58 | 613.06 | 0.62 |
| Tara | 533.15 | 8.64 | 469.59 | 19.01 | 409.66 | 8.58 | 469.59 | 19.01 |
| Chantal | 104.86 | 8.64 | 20.43 | 75 | 1.44 | 8.58 | 20.43 | 74.82 |
| Lucy | 20.43 | 8.64 | 47.75 | 206.50 | 336.36 | 8.58 | 47.75 | 206.21 |
| Debby | 2.76 | 8.64 | 14.53 | 0.63 | 35.40 | 8.58 | 14.52 | 0.62 |
| Faye | 30.03 | 8.64 | 3.65 | 0.40 | 2.76 | 8.58 | 3.65 | 0.41 |
| Grace | 104.86 | 8.64 | 104.86 | 8.64 | 104.86 | 8.58 | 104.86 | 8.58 |
| Jamie | 578.40 | 8.64 | 5.75 | 455.82 | 601.23 | 8.58 | 5.76 | 455.82 |
| Σ | 2489.1 | 77.76 | 1327.23 | 865.04 | 2051.67 | 77.22 | 1327.23 | 885.55 |

| | $SS_{total}$ | $df_{total}$ | MS | F |
|---|---|---|---|---|
| Within | 4540.77 | 18-1=17 | | |
| Column (between conditions) | 154.98 | 2-1=1 | 154.98 | 0.71 |
| Row (respondents) | 2654.46 | 9-1=8 | | |
| Interaction (error) | 1750.59 | 17-1-8=8 | 218.82 | |

(df 1,8, $p<0.05$):5.32

Steps followed as described in Aron and Aron (1999, p. 424-425)

3. Table 11

Analysis of Variance for Exercise Self-efficacy (Competing demands)

| Respondent | Pretest | Posttest | Row Σ | Row M |
|---|---|---|---|---|
| Mary | 6.0 | 46.0 | 52.0 | 26.0 |
| Rita | 32.0 | 23.3 | 55.3 | 27.7 |
| Tara | 72.0 | 66.0 | 138.0 | 69.0 |
| Chantal | 68.0 | 45.0 | 113.0 | 56.5 |
| Lucy | 68.0 | 20.0 | 88.0 | 44.0 |
| Debby | 48.0 | 42.0 | 90.0 | 45.0 |
| Faye | 50.0 | 56.0 | 106.0 | 53.0 |
| Grace | 66.0 | 63.3 | 129.3 | 64.7 |
| Jamie | 18.0 | 52.0 | 70.0 | 35.0 |
| column Σ | 428.0 | 413.7 | | |
| M | 47.56 | 46.0 | GM = 46.8 | |

Squared deviations from grand mean

| Respondent | Pretest | | | | Posttest | | | |
|---|---|---|---|---|---|---|---|---|
| | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ | $SS_{within}$ | $SS_{column}$ | $SS_{row}$ | $SS_{int}$ |
| Mary | 1161.4 | 0.64 | 431.0 | 432.6 | 0.6 | 0.64 | 431.0 | 432.6 |
| Rita | 217.9 | 0.64 | 364.4 | 12.5 | 549.0 | 0.64 | 364.4 | 12.5 |
| Tara | 637.1 | 0.64 | 494.6 | 4.8 | 370.2 | 0.64 | 494.6 | 4.8 |
| Chantal | 451.1 | 0.64 | 94.9 | 114.5 | 3.1 | 0.64 | 94.9 | 114.5 |
| Lucy | 451.1 | 0.64 | 7.6 | 538.2 | 716.1 | 0.64 | 7.6 | 538.2 |
| Debby | 1.5 | 0.64 | 3.1 | 4.8 | 22.7 | 0.64 | 3.1 | 4.8 |
| Faye | 10.5 | 0.64 | 38.9 | 14.4 | 85.4 | 0.64 | 38.9 | 14.4 |
| Grace | 2.0 | 0.64 | 320.8 | 299.3 | 274.6 | 0.64 | 320.8 | 0.3 |
| Jamie | 827.1 | 0.64 | 138.3 | 316.8 | 27.5 | 0.64 | 138.3 | 316.8 |
| Σ | 4259.8 | 5.76 | 1893.6 | 1738.1 | 2049.0 | 5.76 | 1893.6 | 1439.2 |

| | $SS_{total}$ | $df_{total}$ | MS | F |
|---|---|---|---|---|
| Within | 6308.7 | 18-1=17 | | |
| Column (between conditions) | 11.5 | 2-1=1 | 11.5 | 0.03 |
| Row (respondents) | 3787.3 | 9-1=8 | | |
| Interaction (error) | 3177.2 | 17-1-8=8 | 397.2 | |

(df 1,8, $p<0.05$):5.32

Steps followed as described in Aron and Aron (1999, p. 424-425)