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Determinants and Sources of Enjoyment for Exercise
Across the Stages of Change

by

Carol Anne Hills



A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment
of the requirements for the degree of Doctor of Philosophy.

Department of Physical Education & Recreation

Edmonton, Alberta
Spring 2000



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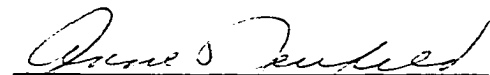
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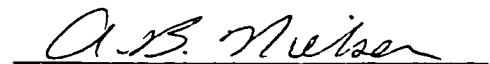
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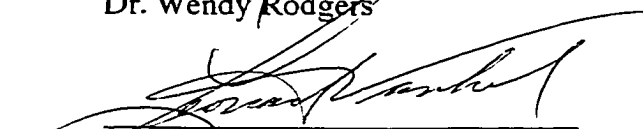

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Dedication

For Rob, in loving memory.

Pursuing graduate studies in the field of recreation was one of many activities that my brother Rob and I enjoyed doing together. The completion of this thesis after his passing has, for me, been a very difficult and painful experience.

I hope that something positive may derive from the tragic circumstances of his death if only as to serve as a warning to us all of the potential negative outcomes that may result from attempts to meet the demands of much too heavy workloads and high expectations imposed on many in today's society, and in academia in particular.

Rob was not able to complete the writing of his thesis. This one's for both of us *mon frere Robere*.

*On and on the rain will fall
Like tears from a star, like tears from a star
On and on the rain will say
How fragile we are, how fragile we are
(Sting)*

Abstract

This study attempts to bridge research in the areas of motivation, behavior change, and exercise psychology to provide a better understanding of exercise behavior. The following chapters present findings generated from a series of studies conducted over a two year period with a sample of employees from a large medical institution that utilized both quantitative and qualitative methods to investigate physical activity involvement.

The first study investigated the applicability to exercise, of a popular model being utilized in the health promotion field, the Transtheoretical Model. Support was found for the stage of change, decision making and self-efficacy constructs of the model as individuals were found to display progression, regression and stability in stage movement patterns over time and self-efficacy and decision making variables were found to be related to stages of change in a theoretically consistent manner. Little support was found for the processes of change construct in relation to the stages of change.

The second and third studies extended beyond the psychological health-behavior perspective of physical activity of the Transtheoretical model by investigating diverse determinants of physical activity behavior, as well as another motive for participation, enjoyment. The second paper examined similarities and differences in barriers and facilitators to physical activity involvement across the stages of change. The findings of this study support previous research indicating that a variety of determinants, including personal, situational and environmental factors, influence exercise behavior, and extend upon previous research by indicating differences in determinants across the stages of change.

The third paper examined the differences in the levels of enjoyment for individuals at various stages of participation in exercise, and explored the sources of enjoyment in physical activity contexts. Levels of enjoyment were found to increase across the stages of change, with active individuals indicating the highest levels of enjoyment of exercise. Several sources of enjoyment were identified using an inductive approach including the environmental context, personal physical and psychological outcomes, dimensions of intrinsic motivation, activity sensations and social benefits. In order to link the three preceding chapters together, the main findings are summarized and suggestions for researchers and practitioners based upon these findings are provided.

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I would like to thank the staff at the University of Alberta Hospitals who participated in this study. This organization was downsized during the course of this study and I am very appreciative of those individuals who continued with the study despite the stressful implications resulting from the organizational change which occurred.

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CHAPTER 1

Introduction

Understanding and facilitating involvement in physical activity has become one area of concern in health promotion as involvement in physical activity is an important lifestyle behavior associated with disease prevention and health enhancement. Many health benefits have been associated with physical activity participation. Physical and psychological benefits such as improvements in cardiovascular health, enhanced immune function, improved self-esteem and decreased incidence of diabetes, obesity, osteoporosis, colon cancer, mild to moderate depression and reductions in anxiety have been related to physical activity involvement (Bouchard, Shephard & Stephens, 1994; Bouchard, Shephard, Stephens, Sutton & McPherson, 1990; Martinsen & Morgan, 1997; Raglin, 1997; Sallis & Owen, 1999; Sonstroem, 1997).

Although participation in physical activity is associated with numerous health benefits, significant numbers of individuals remain sedentary or drop out of physical activity programs (Dishman, 1990). According to population prevalence data in developed countries, between 30 and 60 per cent of adults are sedentary (Stephens & Casperson, 1994; Stephens & Craig, 1990; Canadian Fitness & Lifestyle Research Institute, 1997; Owen & Bauman, 1992; Stephens, 1987; Stephens, Craig & Ferris, 1986). In addition, it has been reported that of those who do begin a physical activity program, 50 per cent drop out within the first three to six months (Dishman, 1990). Therefore, understanding physical activity involvement and the ways in which participation in this lifestyle behavior may be facilitated so that individuals can realize the benefits is an important consideration for improved public health and quality of life. Participation in physical activity is a multifaceted topic, encompassing several areas of research, some of which include research in the areas of exercise psychology, behavior change and motivation.

1.1 The Study of Physical Activity Involvement

The research pertaining to involvement in physical activity may be categorized into two general approaches. One approach utilizes cross-sectional data to identify the correlates or determinants of physical activity participation at a single point in time. The second adopts a program-oriented approach to investigate the effectiveness of various interventions for facilitating physical activity involvement.

1.1.1 Determinants of Physical Activity

Research on the determinants of physical activity has attempted to explain and predict physical activity participation in both structured and unstructured settings. The determinants of physical activity are those factors associated with involvement in physical activity (Sallis & Hovell, 1990). Dishman (1988) stated that determinants "help explain why current activity patterns exist and can specify what must likely be changed to alter them" (p.90). A number of researchers have reviewed the scientific literature concerning the determinants of physical activity (Dishman, 1990, 1991; Dishman & Sallis, 1994; Dishman, Sallis & Orenstein, 1985; Martin & Dubbert, 1982; Sallis & Hovell, 1990; Sallis & Owen, 1999; Wankel, 1987; Willis & Campbell, 1992) and have generally categorized them into three types of determinants: personal attributes, environmental factors and characteristics of physical activity itself.

Dishman and Sallis (1994) indicate that consistent associations have been found between variables in each of the three general categories of determinants, namely personal attributes, the environment, and physical activity, and involvement in physical activity. They state that "these findings re-emphasize the importance of viewing physical activity as being influenced by many forces both inside and outside the person. The influences on physical activity cannot be understood unless characteristics of the person, the environment and the activity itself are assessed" (p.225).

1.1.1.1 Personal Attributes

Determinants that are categorized as personal attributes consist of those variables that originate from or reside within the individual (Dishman, 1990; 1991). They include "past or present knowledge, attitudes, behaviors, personality characteristics, biomedical traits and demographic factors that may influence exercise habits" (Dishman, Sallis & Orenstein, 1985, p.161).

Several demographic variables (e.g., education, income, occupational status, gender, and age) have been related to physical activity participation. Those of higher educational and income levels and occupational status tend to be more active. Age has been found to be negatively associated with physical activity participation (Canadian Fitness & Lifestyle Research Institute, 1996; Dishman & Sallis, 1994; Wankel, 1988; Willis & Campbell, 1992). Men have been found to be more active than women with respect to high intensity activity, however, no sex differences are evident for moderate and low intensity activity (Canadian Fitness & Lifestyle Research Institute, 1996).

Research has also been conducted on physical factors (e.g., body weight, body fat, height, blood pressure, cholesterol and triglycerides, level of fitness, circulatory disability, low metabolic tolerance) as determinants of physical activity involvement. In general, these factors have not been shown to predict physical activity participation in any consistent manner (Dishman, 1990, 1991; Dishman & Sallis, 1994; Willis & Campbell, 1992).

Past and present behaviors including physical activity history and smoking and nutrition practices have also been studied as activity determinants. Past participation in adulthood in both program and free living activity settings has been positively associated with physical activity involvement (Dishman, 1990, 1991; Dishman & Sallis, 1994). The relationship between present adult participation and past participation in childhood has also been studied but is less clear. According to Dishman (1990), "although childhood sport experience can be an agent in socializing adult roles, it can also be overridden by other personal and environmental influences that exert a more immediate effect in adulthood" (p.82). In terms of the association of current behaviors and physical activity involvement, there is some evidence that other health-related behaviors, in particular

smoking and nutrition practices, are associated with participation in physical activity (Wankel & Sefton, 1994).

A number of psychological constructs (e.g., self-efficacy, self-schemata, perceived control, knowledge, attitudes, beliefs, and intentions) have also been studied as determinants of physical activity participation. Reviews of the scientific literature have indicated that cognitive variables influence involvement in physical activity (Dishman & Sallis, 1994; Godin, 1994). Godin (1994) stated that "expectations of self-efficacy, attitudes toward exercising, perceived barriers and past behavior all influence intention and shape behavior" (p. 129-130) and that in some cases, the variables that explain intention also directly influence behavior as well as indirectly influence behavior through their influence on intention.

1.1.1.2 Environmental Determinants

Although many psychological variables and personal attributes have been associated with physical activity participation, these factors alone appear to be non sufficient for explaining and predicting participation in physical activity (Sallis & Hovell, 1990). As a result, research has also been conducted on environmentally based determinants of physical activity participation. These determinants include factors in the social and physical environment. According to Dishman and Sallis (1994), "social support from family and friends is consistently related to physical activity in cross-sectional and prospective studies" (p.222).

Although other environmentally based determinants have not been widely studied, inconvenient access to facilities, lack of time, extreme climate, high cost of programs, and heavy work demands have been associated with low physical activity involvement. Both perceived facility convenience and actual proximity of facilities to residences or workplaces have been positively associated with participation in physical activity (Dishman & Sallis, 1994; Gettman, Pollock & Ward, 1983). One of the most prevalent reasons given for being inactive or dropping out of physical activity is lack of time (Dishman, Sallis & Orenstein, 1985; Martin & Dubbert, 1985). Rather than being a true barrier, lack of time may reflect the existence of poor behavioral skills such as time

management skills, or a rationalization for lack of motivation or commitment to be active or a low priority placed on being active as regular exercisers have been found to be as likely, or even more likely, to view time as a barrier as non-exercisers (Dishman, 1990; Wankel, 1987). There is some evidence of a negative association between extreme weather and physical activity participation (Dishman & Sallis, 1994). The evidence is weak or mixed for an association between owning home exercise equipment and cost of participating with involvement in physical activity (Dishman & Sallis, 1994). Work demands including "travel, physically demanding work, frequent meetings, long hours and demanding supervisors" (Willis & Campbell, 1992, p.31), conflicts with work schedules and lack of supervisor support have been identified as barriers to involvement (Gettman, Pollock & Ward, 1983; Adams & Landgreen, 1988).

1.1.1.3 Characteristics of the Physical Activity Experience

Characteristics of the physical activity experience are also important in enabling or impeding physical activity involvement. Group cohesion and program social support have been found to be positively associated with physical activity participation (Dishman & Sallis, 1994; Thompson & Wankel, 1980; Wankel, 1985). Dishman and Sallis (1994) also state that "both intensity and perceived effort of physical activity appear to be negatively associated with participation in physical activity " (p.225).

1.1.2 Physical Activity Interventions

A number of interventions have been studied in attempts to enhance physical activity involvement. Numerous approaches to behavior change have been applied to the development and application of physical activity interventions. These include interventions based upon behavior modification, cognitive-behavior modification and health education approaches. Behavior modification techniques emphasize the role of environmental antecedents and consequences in influencing behavior and have included intervention techniques such as cueing or stimulus control which involves changing antecedents to behavior, and altering consequences by utilizing reinforcers or punishers

through behavioral contracting. Cognitive-behavior modification often combines several cognitive and behavioral change techniques together in treatment packages. Interventions include self-monitoring, decision-balance analysis, goal-setting, self-reinforcement, changing self-talk and relapse prevention. Self-monitoring requires individuals to record their behavior and its antecedents and consequences, in order to identify factors related to behavior, and to monitor progress. Based upon self-monitoring, goal setting is used to establish activity levels. Both short-term and long-term goals may be established which delineate the type of activity, intensity, frequency and duration targets. The decision-balance technique may be used to facilitate more systematic consideration of the positive and negative consequences of making behavior changes. Self-reinforcement involves individuals rewarding themselves when activity goals are met. Monitoring and changing self-talk is utilized to increase positive thoughts about physical activity. Relapse prevention strategies involve developing plans to prevent and deal with relapses from activity involvement. Health education approaches involve providing information with respect to the health risks and benefits of physically active and sedentary lifestyles and include techniques such as health-risk appraisals, fitness testing and mass media campaigns (Dishman, 1991; Dishman & Sallis, 1994; Sallis & Owen, 1999; Wankel, 1987).

In reviewing the scientific literature of physical activity interventions (Dishman, 1990; 1991; Dishman & Sallis, 1994; Godin & Shephard, 1983; Martin & Dubbert, 1985; Wankel & Hills, 1992), several conclusions have been made. Interventions are associated with increased frequency of physical activity, with typical effect magnitudes ranging from ten to 35 per cent. The impact upon the duration and intensity of physical activity is less clear. The majority of intervention effects have been considered over relatively short periods of time (3 weeks to 6 months). Of those studies that do report follow-ups to the intervention (approximately 50%), the effects of the interventions diminished over time. Although a number of intervention strategies enhance physical activity involvement, no one intervention or combination of interventions have been found to be consistently superior to others, or effective for all individuals.

1.1.3 Physical Activity Determinants and Interventions: A Summary

Research to date on physical activity determinants and interventions has been criticized for not taking into consideration the process of exercise acquisition and maintenance. Sallis and Hovell (1990) suggest that the determinants of participation are likely to be different for the various transition points in the process of physical activity involvement. They suggest that the determinants of adopting exercise are not necessarily the same as those involved in the maintenance of physical activity participation or in resuming involvement after dropping out. According to Dishman and Sallis (1994), determinants research to date has "not adequately addressed the question of differences in determinants of adoption versus maintenance of physical activity" (p.222). Sallis and Hovell (1990) suggest that "contrasting the relative strengths of environmental, social, cognitive, and physiological variables on the adoption, maintenance and resumption of exercise may provide information that will help in the design of appropriate interventions" (p.323).

It has also been suggested that in order to improve the effectiveness of interventions to enhance physical activity involvement, more theory-based research is required, and that intervention strategies need to take into consideration the various stages of participation in physical activity. According to Dishman and Sallis (1994) "most interventions have not been based on a broader theoretical model of behavior change such as stage theories and have not considered activity history and the companion literature on the determinants of physical activity" (p.232).

1.2 The Study of Behavior Change: The Transtheoretical Model Approach

Although as noted, the atheoretical nature of much of the exercise adherence research has been criticized (Dishman, 1990; Dishman & Sallis, 1994; Dishman, Sallis & Orenstein, 1985), a number of psychological models have been employed in attempts to understand participation in physical activity. These models include the health belief model (Rosenstock, 1974), the theory of reasoned action (Fishbein & Ajzen, 1975), the theory of planned behavior (Ajzen, 1985; 1987), self-efficacy theory (Bandura, 1977),

social cognitive theory (Bandura, 1986), the psychological model of physical activity participation (Sonstroem, 1978, 1988; Sonstroem & Morgan, 1989), protection motivation theory (Rogers, 1975), the theory of interpersonal behavior (Triandis, 1977), and the subjective expected utility theory (Edwards, 1961).

Many of these models have been criticized for being static in nature in that involvement in physical activity is largely treated as a dichotomous, all-or-none variable. As a result, the dynamic, continuous process of behavior change has not been taken into consideration in using many of these models (Dishman, 1982; Sonstroem, 1988). One model that considers the dynamic nature of the change process and that has been adapted for use in studying physical activity participation is the Transtheoretical Model of Behavior Change (Marcus, Selby, Niaura & Rossi, 1992; Marcus & Simkin, 1994; Prochaska & Marcus, 1994; Sonstroem, 1988).

The Transtheoretical Model developed from a desire to identify generic aspects of behavior change. The study of behavior change provides insight into the initiation and regulation of behavior and the processes and mechanisms involved in facilitating health-related behaviors. The study of personal-change endeavors is both extensive and diverse. A variety of domains in which individuals seek change and various modalities of change have been investigated from clinical and social psychological perspectives. Although the literature is extensive with respect to certain domains (addictions, problem behaviors, lifestyles, relationship patterns) and modalities (psychotherapy, personal growth and self awareness groups, self change attempts, self help groups), the literature concerning general variables, processes and themes of personal change is scarce. A more comprehensive understanding of personal change may be gained by studying generic aspects, processes and conceptions of personal change (Klar, 1992).

One area of research in the clinical psychology literature that has attempted to identify generic aspects of behavior change evolved from a recognition that personal change attempts often do not involve participation in formal change programs. However, these informally undertaken attempts often use processes and methods that are similar to those used in formal change programs and similar processes are identified in the leading

systems of psychotherapy. This recognition led to the development of the Transtheoretical Model of Behavior Change (Prochaska, 1979).

The Transtheoretical Model was developed from research on smoking cessation (Prochaska & DiClemente, 1985). It has since been applied to other addictive behaviors (alcoholism) and health-related behaviors (nutrition, exercise, mammography screening, sun screen exposure). The two core components of the Transtheoretical Model are the stages and processes of change. Through research in studying smoking cessation, Prochaska and his colleagues discovered that change unfolds through a series of stages. Although the number of stages identified have changed over time (Farkas, Pierce, Gilpin & Zhu, 1996), currently five stages are commonly identified and defined according to the individuals' intentions and behaviors regarding the targeted area of behavior change. The five stages of change are defined as follows (DiClemente, Prochaska, Fairhurst, Velicer, Velasquez & Rossi, 1991):

Precontemplation: Not engaged in or considering changing the target behavior.

Contemplation: Not engaged in targeted behavior, but seriously considering it within the next six months.

Preparation: Considering changing behavior within the next month and have made some small behavioral changes already.

Action: Changed behavior within past six months.

Maintenance: Changed behavior and have maintained it for more than six months

The stages of change are conceptualized as being relatively stable, yet changeable, falling between unstable states and stable traits. Although it is proposed that individuals will move through each of the stages in making successful behavior change, progression through the stages does not necessarily occur in a linear manner. Rather, individuals may progress and regress through the stages several times before successful change is achieved. As well, although the potential for change exists, individuals may remain at certain stages for considerable lengths of time. In general, the adoption of

behavior is considered as the progression from precontemplation, contemplation or preparation to action or maintenance, while relapse from a behavior involves movement from either action or maintenance to precontemplation, contemplation or preparation. In utilizing the concept of stages of change, the Transtheoretical Model views behavior change as a dynamic, on-going process rather than a static all-or-nothing phenomenon.

The second component of the Transtheoretical Model is the "processes of change". The processes of change have been defined as the "covert and overt activities that individuals use to modify problem behaviors " (Prochaska, Velicer, DiClemente & Fava, 1988, p.520). Prochaska and his colleagues not only reviewed the major systems of therapy, but studied therapy-directed changers and self changers as well in identifying and investigating the processes of change. (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). Prochaska and his colleagues have identified ten processes of change. The processes of change have been classified both conceptually and empirically, through confirmatory factor analysis, into two categories, the experiential or covert processes and the behavioral or overt processes. The five experiential processes are derived from the traditions of cognitive psychology and involve an experiential restructuring component while the five behavioral processes derive from the behavioristic traditions of psychology and involve more specific and observable behaviors (Prochaska, Velicer, DiClemente & Fava, 1988). The ten processes of change have been defined and categorized as follows: (Prochaska, Norcross, Fowler, Follick & Abrams, 1992, p.37)

Experiential Processes

Consciousness Raising: Increasing information about self and problem.

Self-reevaluation: Assessing how one feels and thinks about oneself with respect to a problem.

Dramatic Relief: Experiencing and expressing feelings about one's problems and solutions.

Environmental Reevaluation: Assessing how one's problems affect physical environment.

Social Liberation: Increasing alternatives for nonproblem behaviors available in society.

Behavioral Processes

Self-liberation: Choosing and commitment to act or believe in ability to change.

Counterconditioning: Substituting alternatives for problem related behaviors.

Stimulus Control: Avoiding stimuli that elicit problem behaviors; adding stimuli that encourage alternative behaviors.

Reinforcement Management: Rewarding oneself or being rewarded by others for making changes.

Helping Relationships: Being open and trusting about problems with someone who cares.

Prochaska and his colleagues discovered that the "concept of stages was the key to relating all the various change processes from theoretically incompatible systems of psychotherapy in a coherent fashion" (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983; Prochaska, DiClemente, Velicer, Ginpil & Norcross, 1985; Prochaska, Norcross & DiClemente, 1994, p.38). Prochaska, Norcross and DiClemente (1994) state that "successful changers used these tools only at specific times, choosing a different one whenever the situation demanded a new approach. And these specific times were constant from one person to the next, regardless of what their problem was" (p.38).

Based upon this research in smoking cessation and across other problem behaviors, several general observations have been made regarding the integration of stages and processes (Prochaska & Marcus, 1994). In general, the processes of change are used less by individuals in the Precontemplation stage. The experiential processes are used to a similar degree by individuals in the Contemplation and Preparation stages. Use of the experiential processes peaks in the Preparation stage and then declines through Action and Maintenance. Use of the behavioral processes increases from Contemplation to Preparation to Action, peaks in Action, and then declines in Maintenance. Prochaska and Velicer (1997) state, however, that more basic research involving the integration of stages and processes is required due to some lack of consistency in the current research findings across problem behaviors.

In addition to studying the link between the processes and stages of change, Prochaska and his colleagues have also investigated the relationship between stages of

change and two other factors that have been considered important for behavior modification, namely decision-making and self-efficacy. Janis and Mann's (1977) conflict model of decision making that involves making comparisons between the perceived gains (pros) and perceived losses (cons) in decision making, has been used in studying the relationship between this variable and stages of change. Velicer, DiClemente, Prochaska and Brandenburg (1985) "concluded that the decisional balance construct could be usefully allied with the stages of change model in studying the pattern of cognitive and motivational shifts across the stages" (Prochaska, Velicer, Rossi et al. 1994, p.40). Prochaska and colleagues (1994) reviewed research investigating the relationship between stages of change and decisional balance for twelve behaviors and found that some highly predictable patterns emerged. They stated that for "all twelve samples, the cons of changing the problem behaviors outweighed the pros for subjects who were in the precontemplation stage. The opposite was true for subjects in the action stage in 11 of the 12 samples" (p.44). Prochaska, Velicer, Rossi and colleagues also indicated that for all twelve behaviors, the pros of changing are higher in contemplation than in precontemplation, and that the cons of changing are lower in action than in contemplation, suggesting that progressing from contemplation to action involves an "increase in the pros followed by a decrease in the cons (that) should lead to a crossover in the decisional balance from the cons being greater in precontemplation to the pros being greater in action. In just which stage the crossover occurs is a function of how much and when the pros increase and how much and when the cons decrease"(p.44). Based upon the existing data, they predict that "for most problem behaviors people will decide that the pros of changing the behavior outweigh the cons before they take action to modify their behavior" (p.44), but suggest that further research is required to support this interpretation.

The relationship between stages of change and self-efficacy has also been investigated. Bandura (1977, 1986) has proposed self-efficacy as a key variable of behavior change. Self-efficacy is "the belief that one is capable of performing behaviors that produce certain outcomes" (Willis & Campbell, 1992, p.134). According to Bandura, "self-efficacy expectations determine a person's choice to participate in events,

the amount of effort the person expends, and the person's persistence "(Willis & Campbell, 1992, p.134). DiClemente, Prochaska and Gibertini (1985) found that self-efficacy differed significantly across the stages of change, increasing from precontemplation to contemplation, to action into maintenance.

Research to date on the Transtheoretical Model has demonstrated that the "structure of change involves systematic relationships between the stages people are in and the processes they use to progress through each stage of change" (Prochaska, DiClemente & Norcross, 1994, p.112) and has also demonstrated a relationship between decision-making, self-efficacy and the stages of change. The Transtheoretical Model developed from research on smoking cessation, and since has been applied to a number of different health-related behaviors to investigate its generalizability across problem behaviors. Exercise is one behavior to which its applicability has been studied.

1.2.1 The Transtheoretical Model and Exercise

Several reasons have led to the suggestion that the Transtheoretical Model, which has guided research in a variety of behavior change domains, may be useful in understanding and guiding research and practice with respect to involvement in physical activity. First, the model addresses the dynamic process involved in changing from a less healthy to a more healthy lifestyle. Prochaska and Marcus state "in accordance with its dynamic focus, the transtheoretical model suggests that behavior change is not an all-or-none phenomenon and that individuals who stop performing a behavior may intend to start again" (1994, p.172).

Secondly, Prochaska and Marcus (1994) suggest that the lack of success in improving long-term maintenance of exercise behavior is largely due to a mismatch between the interventions used and the condition of the population. They indicate that most exercise programs are action-oriented, or designed for individuals who have already decided to begin or continue in an exercise program. The problem is, however, that a large portion of the population to which these interventions are applied participate in virtually no exercise and likely have little interest in beginning to exercise. Thus successful interventions must be tailored to the needs of the population of interest. The

Transtheoretical Model has been successfully applied to tailoring interventions for such precontemplators in the domain of addictive behaviors and may be useful in guiding the design of successful exercise interventions" (Prochaska & Marcus, 1994, p.172).

A third argument that has been presented for applying the Transtheoretical Model to the study of exercise behavior is related to the similarity of exercise attrition rates to patterns of treatment relapse for various addictive behaviors. Prochaska and Marcus (1994) state that "the pattern of exercise relapse is similar to the negatively accelerated relapse curve often seen in the study of addictions (Hunt, Barnett & Branch, 1971)" (p.172). This similarity suggests that using models that have guided research in the area of addictive behaviors may be useful in guiding research in the area of exercise behavior.

Several studies to date have applied the Transtheoretical Model to exercise. In the initial application of the Transtheoretical Model (Sonstroem, 1987: 1988), two hundred and twenty males over 30 years of age were classified into stages of change based upon self-reported exercise history over the previous four years. Subjects were classified into four stages of change: precontemplation, contemplation, action and maintenance, using a questionnaire involving three questions. The respondents answered each question with a yes/no format. The first question was: "Outside of job responsibilities, are you presently engaged in a regular program of physical exercise (By this is meant a program that includes vigorous endurance, and aerobic exercises for at least 20-30 minutes three times per week)?" This question was used to determine if respondents were actually exercising at that point in time. Those who responded positively to this question were then asked to indicate the number of years and months they had been involved in this exercise program. Those involved for less than two years were categorized as being in the action stage, while those involved for more than two years were considered maintainers. Those who responded negatively to the first question were asked about their exercise history with a second question, "At any time in the past four years have you been involved in a regular program of physical exercise? If yes, how many different times?"; and were asked about their intentions to exercise with a third question, "During the past three months, have you thought seriously about joining or starting a program of regular exercise?". Those who responded positively to the third question and had no previous

history of exercise were considered contemplators. Those who responded negatively to all of the questions were classified as precontemplators. Question two was also used for identifying dropouts.

The purpose of the Sonstroem study was to test the applicability of the stage model to exercise participation, and to examine the utility of belief statements in predicting stages of exercise. Originally a pool of 69 belief statements that were derived from interviews with exercise leaders were found to predict stages of exercise adoption. In subsequent analyses, it was decided to reduce the demarcation point between action and maintenance from two years to six months to be consistent with the observed drop out patterns for structured exercise programs (Dishman, 1984, 1990).

Stage classification frequencies were as follows: Precontemplation n=61, Contemplation n=78, Action n=7 and Maintenance n=58. The belief statements were categorized through principle component analysis into seven components: benefits, barriers, novelty outlet, social outlet, fear, appearance and psychological gain. The belief statements distinguished precontemplators and maintainers, but did not distinguish between the contemplation, action and maintenance stages. Sonstroem (1987) reported that precontemplators were found to hold strong negative beliefs about exercise, whereas maintainer's beliefs were more positive. The contemplator group demonstrated a mid-range level for all belief components indicating that they weight the pros and cons of exercising quite similarly. In further analyses, those individuals that had been active but were not any longer but intended to be active again were categorized as a relapser group (n=35). These individuals were found to differ significantly from contemplators in that they held more favorable beliefs concerning both the general and social benefits of physical activity and were less fearful of the consequences of engaging in exercise. Those in the action group were found to rate the barriers of exercise as significantly lower than the relapsers. Although this study provided an initial application of the Transtheoretical Model to exercise and demonstrated that beliefs varied across stage of exercise participation, Sonstroem indicated that it's conclusions are limited due to a cross-section design, reliance on self-reports, small sample size in several of the stages, and lack of optimal measurement tools.

Bess Marcus and her colleagues have developed measurement tools for applying the Transtheoretical Model to exercise. Marcus, Selby, Niaura and Rossi (1992) developed a scale to measure the stages of change for exercise. This measure consisted of a five item measure using a five-point Likert scale (1=strongly disagree to 5=strongly agree) to rate each item. Subjects were presented with the following items for each corresponding stage:

- Precontemplation: I currently do not exercise and I do not intend to start exercising in the next six months
- Contemplation: I currently do not exercise but I am thinking about starting to exercise in the next six months
- Preparation: I currently exercise some but not regularly
- Action: I currently exercise regularly but I have only begun doing so within the last six months
- Maintenance: I currently exercise regularly and I have done so for longer than six months.

Regular exercise was defined as participating in exercise three or more times per week for at least twenty minutes each time. Subjects were placed into the stage that they endorsed most strongly. If subjects did not agree or strongly agree with any of the items, they were not classified into a stage. This measure differentiated subjects into stages with a kappa index of reliability over a two-week period of .78. However, 7 per cent of the sample could not be classified into a stage due to the pattern of responding. Marcus, Selby, and colleagues (1992) suggested that future measures include a yes/no format or a scoring algorithm so that all subjects could be classified into a stage.

The stage of change instrument was modified again by Marcus, Eaton, Rossi and Harlow (1994). The stages were measured using an 11-point scale in the shape of a ladder. Respondents were asked to pick the rung of the ladder that most accurately described their current exercise behavior. Each rung was numbered, and five of the rungs had written labels corresponding to the stages of change. Respondents could pick rungs that were not labeled, but were classified into the closest stage for which they met the

minimum requirements. In responding to this measure, 68% of the subjects selected one of the five-labeled rungs. Based on this, it was suggested that the ladder could be shortened in future studies.

Evidence to support the construct validity of the stage of change measure for exercise has been presented in that it has been consistently related to the processes of change (Marcus, Rossi, Selby, Niaura & Abrams, 1992), decision making and self-efficacy (Marcus, Eaton, Rossi & Harlow, 1994, Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992; Marcus, Selby, Niaura & Rossi, 1992). In addition, two studies have demonstrated the concurrent validity of this measure. Marcus and Simkin (1993) compared the stage of change instrument with the Seven Day Physical Activity Recall Questionnaire (Blair, 1984) and found that self-reported levels of physical activity corresponded with reported stages of change. The results revealed that individuals in the action/maintenance stages reported more moderate and vigorous physical activity compared to subjects in the precontemplation/contemplation stages, and more vigorous physical activity compared to those in the preparation stage.

Wyse, Mercer, Ashford, Buxton and Gleeson (1995) also investigated the concurrent validity of the stages of change scale. Exercise behavior was measured using the Godin Leisure Time Physical Activity Questionnaire (Godin & Shephard, 1985). Subjects in action/maintenance reported significantly greater levels of exercise than those in preparation and precontemplation/contemplation. These differences were most pronounced for higher intensity exercise. In addition, subjects in action/maintenance reported significantly higher levels of moderate intensity exercise than those in precontemplation/contemplation and preparation. These findings provide further support for the concurrent validity of the stage of change measure.

Cardinal (1995; 1997) also investigated the construct validity of the stages of change for exercise measure. He examined the relationship between the stages of change measure and energy expenditure, cardiorespiratory fitness, body mass index, exercise behavior, relapse, barriers and self-efficacy. Significant between stage differences were found for each variable, with a pattern of improvement being observed from precontemplation through maintenance.

Initial evidence for the predictive utility of the stages of change scale has also been demonstrated. Marcus, Eaton, Rossi and Harlow (1994) indicated that stage of change predicted 24% of the variance in vigorous and moderate levels of physical activity of employees from four worksites over a period of six months.

Several studies have been conducted to investigate the processes of change and other correlates of the stages of change for exercise. Marcus, Rossi, Selby, Niaura and Abrams (1992) developed a processes of change questionnaire for exercise that adapted many of the items from the measure developed for smoking. A 39-item paper and pencil questionnaire was developed, with statements representing each of the ten processes of change. Subjects were instructed to think back over the past month and rate the frequency of occurrence of each item on a five-point Likert scale (1=never to 5=repeatedly). In the initial study investigating the integration of the stages and processes of change for exercise, Marcus, Rossi, Selby, Niaura and Abrams (1992) reported that subjects in different stages used the processes of change in significantly different ways. Those in the precontemplation stage used all ten processes of change less than did subjects in the other stages. Differences between the contemplation and preparation stages in the use of the experiential processes were not significant, but use of these processes tended to peak in the action stage. Three of the experiential processes, self-reevaluation, environmental reevaluation and dramatic relief, were used more in the action stage than in maintenance. Use of the behavioral processes increased from the precontemplation to action stages. Self-liberation, reinforcement management and counterconditioning were used significantly more in preparation than in contemplation. In addition, use of all five behavioral processes increased significantly between preparation and action. Frequency of use of the behavioral processes did not significantly differ between action and maintenance.

Gorely and Gordon (1995) examined the integration of the stages and processes of change with a sample of 583 older adults aged 50-65 years. Those in the precontemplation stage used each of the processes significantly less than those in the other stages of change. The experiential processes of consciousness raising and self-reevaluation were found to increase from preparation to maintenance. Use of the

behavioral processes of counterconditioning and self-liberation increased from contemplation to preparation to action, while use of stimulus control increased from preparation to maintenance. Although these results are generally similar to the findings of Marcus and her colleagues, some inconsistencies were noted in that only five processes differentiated beyond the precontemplation stage.

Marcus, Simkin, Rossi and Pinto (1996) investigated process use among subjects maintaining, adopting, and relapsing from exercise involvement. Individuals' stage and processes of change were assessed at baseline and at a six-month follow-up among 314 employees of a retail outlet and industrial manufacturer. Based upon stage of change assessments, individuals were categorized as exercise adopters, relapsers, stable sedentary and stable actives. Change in process use was assessed using MANOVA with follow-up univariate analyses for each group. Marcus, Simkin and colleagues reported that the stable profiles were associated with no significant change in process use, use of all of the processes except social liberation increased for the group of adopters, and use of all behavioral processes and one experiential process, dramatic relief, decreased significantly for the relapse group.

The integration of the stages of change, self-efficacy and decision making for exercise has also been investigated by several researchers. Marcus, Selby, Niaura and Rossi (1992) developed a five-item self-efficacy for exercise measure with internal consistency of .76 and test-retest reliability over a two-week period of .90. Subjects rated each item using a 7-point scale. Several studies utilizing both cross-sectional and longitudinal analyses have reported a relationship between the self-efficacy measure and stage of change in a manner consistent with findings in the area of smoking (Gorely & Gordon, 1995; Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Selby, Niaura & Rossi, 1992; Wyse et al., 1995). Maintainers had the highest efficacy scores while precontemplators and contemplators had the lowest. In addition, individuals with higher self-efficacy scores were more likely to participate in physical activity six months after the initial assessment (Marcus, Eaton, Rossi & Harlow, 1994).

Marcus, Rakowski and Rossi (1992) developed a decisional balance measure for exercise, that was similar to the one developed for smoking cessation (Velicer et al.,

1985).consisting of six con and ten pro items with a five point Likert scale to rate the importance of each item. In further studies, this scale (Gorely & Gordon, 1995) or a modified one consisting of three pro items and three con items (Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992) were used. In both cross-sectional and longitudinal studies, the pros and cons were found to be related to stage of change in a theoretically consistent manner. The pros of exercise tended to increase from precontemplation to maintenance, the cons decreased from precontemplation to maintenance, and the cross-over in the relative prevalence of the two occurred in the preparation stage (Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992). Precontemplators were found to place greater emphasis on the negative aspects of exercising, while maintainers placed greater emphasis on the positive aspects of exercise (Gorely & Gordon, 1995). Marcus, Eaton, Rossi and Harlow (1994) utilized structural equation modeling procedures and indicated that perceiving low costs and high benefits was positively related to greater readiness for exercise and exercise behavior six months after the pros and cons were assessed.

Several researchers have investigated the association of exercise determinants with stage of change. Although these studies used different measures to assess stage of readiness for physical activity involvement, measures of stage of change were shown to be associated in meaningful ways with a number of variables. These studies have indicated that differences exist between individuals representing various stages of change in some of the determinants of exercise including perceived severity of a health threat, beliefs, perceived benefits and barriers, subjective norm, attitude, perceived behavioral control, intention, exercise knowledge, physical self perceptions, and global self-esteem (Blalock et al., 1996; Booth et al., 1993; Courneya, 1995a, 1995b; Godin, Shephard & Colantonio, 1986; Godin, Desharnais, Valois & Bradet, 1995; Lee, 1993; Myers & Roth, 1997; Wyse, Mercer, Ashford, Buxton & Gleeson, 1995).

Lee (1993) reported that "exercise knowledge, perceived family support and perceived psychological benefits of exercise distinguished the action group from the precontemplators, whereas perceived barriers were the major difference between the contemplation and action groups" (p.479). Booth and colleagues (1993) reported that

more strongly held beliefs about the benefit of exercise for preventing heart disease were associated with greater levels of physical activity.

Wyse and colleagues (1995) found that subjects in action/maintenance reported significantly greater scores than those in precontemplation/contemplation and preparation for global self-esteem, sports competence, physical condition and physical self-worth indicating the "adoption and maintenance of regular exercise appears to be associated with feelings about the self in general and perceptions of the physical self in particular" (p.374). Perceived bodily attractiveness did not significantly differ between stages of change for females, but did for males with active males reporting higher attractiveness scores than inactive males.

Blalock and colleagues (1996) reported that women never-engaged in exercise were found to have less knowledge about osteoporosis and weaker subjective norms than women in the other stages of change. Women currently engaged in exercise reported more exercise benefits and higher self-efficacy than never or previously engaged women. Women in the active stage reported more health motivation, greater self-efficacy, stronger beliefs in the effectiveness of exercise in reducing the risk of osteoporosis and fewer exercise barriers with respect to health concerns and inconvenience.

Courneya (1995a; 1995b; 1997) reported significant differences between stages of change for perceived severity or seriousness of a health threat, beliefs, subjective norm, attitude, perceived behavioral control and intention. Courneya (1995a; 1995b) found that intention, attitude and perceived behavioral control were the most important discriminators among stages. Courneya (1997) also reported that perceived seriousness of a health threat from physical inactivity was found to separate those in precontemplation from contemplation and those in preparation from those in action and maintenance.

Myers and Roth (1997) examined the relationship between stage of change and perceived benefits and barriers to exercise by assessing perceived benefits and barriers through a scale that they derived as part of their study that measured social, psychological, body image and health benefits and time-effort, physical, social and other miscellaneous barriers. They reported that in terms of time-effort barriers, those in

precontemplation reported more barriers than those in contemplation and those in contemplation reported more than those who were active. In addition, those in precontemplation and contemplation perceived more social barriers than those in maintenance. Those in precontemplation perceived fewer benefits than those in the active stages. Participants in the action stage reported more psychological and health benefits than those in contemplation, and more health benefits than those in the maintenance stage.

Godin, Shephard and Colantonio (1986) compared the cognitive profile of those who intend to exercise but do not with those who follow through with their intentions. Individuals were categorized based upon the congruence between their stated intention to exercise and their actual behavior two months after their intentions were measured. Differences were found in perceptions of time, perceptions of energy for exercise, and value placed on health. Individuals who were sedentary but intended to be active perceived exercise as physically demanding and had difficulty in meeting the time demands required of an exercise program. Individuals with positive intentions identified more advantages to being active than those with negative intentions.

Godin, Desharnois, Valois and Bradet (1995) examined differences between stages of change and psychosocial factors from social cognitive theory. Individuals were categorized into five stages that were numbered based upon intention and behavior. Stage 1 consisted of inactive individuals who did not intend to exercise. These individuals did not perceive benefits to exercise or feel social pressure to exercise, but do perceive barriers. Individuals at stage 2 are sedentary but considering becoming active on a regular basis. They expect large benefits from exercising and displayed a positive perceived behavioral control. Individuals at stage 3 were moderately active with a low intention to exercise regularly. These individuals exhibited a negative evaluation of perceived behavioral control suggesting that they perceive the adoption of regularly exercise as very difficult. Individuals at stage 4 were moderately active with a high intention to participate regularly, whereas individuals at stage 5 were very active with a high intention to continue to be very active. Perceived behavioral control was found to

be higher for individuals at stage 4 than stage 3 and higher for individuals at stage 5 than stage 4.

Most of the research investigating the relationship between stage of change and exercise determinants has been quantitative in nature. A few qualitative studies have been conducted to date. Gauvin (1990) conducted an exploratory, qualitative study in an attempt to "describe the cognitive, emotional and behavioral concomitants of direction, intensity and persistence for exercise in individuals displaying different levels of exercise involvement" (p.52). She classified 78 individuals as autonomous exercisers or those not involved in a formal fitness program, fitness program enrollees, fitness program dropouts or non-exercisers and interviewed them concerning their thoughts, feelings and behaviors with respect to exercise prior to, during, and following a workout. Autonomous exercisers and fitness program enrollees were found to participate in exercise primarily for fitness and aesthetic reasons. Autonomous exercisers were found to like aspects of physical activity itself, reported not having to do anything in particular to make sure they "work out", and reported feeling energized after a workout. This was in contrast to the other types of exercisers who generally liked extraneous aspects of the exercise experience, had to push themselves and plan to ensure participation in exercise and reported feeling fatigued following physical activity. Although Gauvin (1990) did not employ the stages of change per se in her study, this investigation did capture differences in factors associated with involvement in physical activity for individuals at different levels of involvement in physical activity. She suggested that autonomous exercisers likely represent those in the maintenance stage of involvement while fitness program enrollees are likely in the adoption stage.

O'Brien Cousins and Keating (1995) conducted two strategic focus groups of women over age 60. One group represented physically active women involved in adult gymnastics at least twice a week as well as other activities such as fitness programs and yoga. The second group was comprised of inactive women who maintained their own households but were not involved in regular recreational physical activity. The purpose of the research was to explore variations in life course experiences that would explain later-life physical activity. All of the women were found to be physically active in

girlhood and experienced similar role changes in adulthood. The inactive women expressed an awareness of lack of physical skills in childhood, viewed developmental challenges in girlhood as a reason to be less active, and saw their family roles as requiring self-sacrifice and often withdrawal from unnecessary physical tasks. Active women, however, viewed developmental challenges in girlhood as a reason to increase activity as compensation and resisted the potential restrictions imposed by their family roles in adulthood to maintain their involvement in physical activity. Throughout life, active women seemed to be seeking or creating opportunities to be active, while inactive women used the same opportunities to remain sedentary. O'Brien Cousins and Keating (1995) suggest that women's perceptions at turning points in their lives provide an important influence in determining whether they will strive to be sedentary or active.

Leith and Shaw (1997) utilized a qualitative approach to study non-participation in physical activity. Twelve women who were considered low level participants by their participation rates and self-definitions of being inactive were interviewed about their individual feelings, perspectives and meanings on their sedentary lifestyle. Leith and Shaw (1997) indicated that there is a "need to take personal experiences and social interpersonal factors, as well as the conflicting nature of these factors, into account in understanding non-participation" (p.360) as many of the women they interviewed wanted to participate more even though they made no attempts to increase their participation in physical activity and indicated disliking physical activities. They suggest that non-participation is explained by contradictory experiences that result from contradictory pressures.

Much of the research investigating the Transtheoretical Model has been cross-sectional in nature. Although the model incorporates the stage construct to reflect the dynamic nature of the change process, longitudinal research is required to more accurately reflect the temporal dimension of the change process and provide a more detailed description of how change variables (processes, decision balance, and self-efficacy) are used when subjects are progressing and regressing between stages or remaining stable within a particular stage. Some prospective studies have also been conducted.

Armstrong, Sallis, Hovell and Hofstetter (1993) examined components of the Transtheoretical Model in a prospective study of the adoption of vigorous exercise. Armstrong and colleagues conducted an initial baseline survey assessing stage of change, self-efficacy and participation in regular vigorous exercise. A follow-up survey conducted two years later assessed exercise behavior during the 24 months post-baseline period. Baseline stage and self-efficacy were found, through regression analysis, to be significant predictors of exercise six-months post baseline. Each variable accounted for seven percent of the variance in exercise behavior. In addition, a significantly higher percentage of contemplators than precontemplators were found to enter action (46% vs. 25%) and maintenance (25% vs. 6%) post-baseline confirming that initial stage is important in determining the amount of subsequent progress through the stages of change.

Cardinal (1997) studied the role of stage of change in predicting the adoption and maintenance of naturally occurring exercise. He reported that baseline stage was a significant predictor of progression in stage of exercise at both one and seven month follow-ups, but found that those in preparation were less likely to progress and were not involved in higher levels of exercise than those in contemplation.

Marcus, Eaton, Rossi and Harlow (1994) investigated the relationship between the stages of change, self-efficacy and the costs and benefits of exercising using longitudinal physical activity data. Using confirmatory structural equation modeling procedures, Marcus et al. (1994) reported excellent predictability of physical activity involvement over a six month interval with stage of change explaining much of the variance (28%) in physical activity as measured by the seven-day physical activity recall questionnaire (Blair, 1984) six months after stage assessment. The independent constructs (self-efficacy, cons and pros of exercise) were also found to explain much of the variance (43%) in the stage of exercise. Direct paths to physical activity were not significant for the independent constructs, but rather were found to influence physical activity only indirectly, mediated by exercise stage of change.

Marcus, Simkin, Rossi, and Pinto (1996) also investigated the Transtheoretical Model using a longitudinal approach. Marcus and colleagues assessed the stages and

processes of change among employees of two worksites at baseline and a six-month follow-up. Subjects were categorized into four distinct groups of exercise behavior based upon their stage of exercise at baseline and follow up: stable sedentary (subjects remaining in precontemplation and contemplation at baseline and follow-up); stable active (subjects remaining in preparation, action and maintenance at both assessments); adopters (subjects who moved from precontemplation or contemplation to preparation, action or maintenance); and relapsers (subjects who moved from preparation, action or maintenance to precontemplation or contemplation). These categories were not considered exhaustive (69 individuals did not fit into a category) but rather were considered the main traditional conceptual transitions of exercise stage of change. The stage of change patterns were reported as follows (Table 1-1):

Table 1-1
Patterns of Stage Change
(Marcus, Simkin, Rossi & Pinto, 1996)

Stage of Change	n	%
<i>Exercise Adopters</i>	63	26%
Precontemplation to preparation	6	10
Precontemplation to action	4	6
Precontemplation to maintenance	9	14
Contemplation to preparation	19	30
Contemplation to action	12	19
Contemplation to maintenance	13	21
<i>Exercise Relapsers</i>	37	15%
Preparation to precontemplation	2	5
Preparation to contemplation	13	35
Action to precontemplation	3	8
Action to contemplation	5	14
Maintenance to precontemplation	4	11
Maintenance to contemplation	10	27
<i>Stable Sedentary</i>	78	32%
Precontemplation to precontemplation	41	53
Contemplation to Contemplation	37	47
<i>Stable Active</i>	67	27%
Preparation to preparation	12	18
Action to Action	6	9
Maintenance to maintenance	49	73
<i>Total</i>	245	100%

These results indicate that for this sample, more individuals remained in a stable stage pattern (59%) than those who changed stages (41%). Of those who were originally sedentary at baseline (54%), the majority remained sedentary (32%). Of those inactive who became active, most were in contemplation at baseline (70%) although there were individuals in a six-month period that progressed from precontemplation to adopting

activity suggesting that progression through the stages may occur over a relatively short period of time. Fewer individuals became sedentary (15%) than those who adopted activity (26%). Of those who were originally active at baseline (46%), the majority remained active (27%). The majority of the relapsers regressed only to the contemplation stage (76%) suggesting that those who were involved in exercise tend to want to become involved again.

1.2.2 The Transtheoretical Model and Exercise: A Summary

It has been suggested that the Transtheoretical Model, which has guided research in a variety of behavior change domains, may be useful in understanding and guiding research with respect to involvement in physical activity (Prochaska & Marcus, 1994). Research applying the Transtheoretical Model to exercise has provided some evidence for the generalizability of this model to exercise, however, discrepancies also exist in research findings. Studies have reported differences in the number of processes used in the behavior change process for exercise (Marcus, Simkin, Rossi & Pinto, 1996; Marcus, Rossi, Selbi, Niaura & Abrams, 1992; Gorely & Gordon, 1995), as well as the movement patterns in stages of change over time (Armstrong, Sallis, Hovell and Hofstetter, 1993; Marcus et al., 1996; Cardinal, 1997).

In terms of use of the processes of change, Marcus, Rossi, and colleagues (1992) reported significant differences in use of all ten processes of change across the stages of change. Gorely and Gordon (1995) however, reported that only five processes made significant contributions to the movement across stages. Research in smoking cessation has found that all processes, except environmental reevaluation, contributed to predicting changes in stage over time. The one research study in exercise to date investigating the relationship between stages and processes of change over time found that all processes, except social liberation, influenced the adoption of exercise, while only six processes influenced relapse from an active to an inactive lifestyle. It is still unclear as to which processes of change are utilized for exercise behavior change.

Discrepancies have also been found with respect to stage movement patterns over time. Consistent with the Transtheoretical Model, Armstrong and colleagues (1993) and

Marcus and colleagues (1996) reported that contemplators were more likely than precontemplators to enter action and maintenance over time. Cardinal (1997), however, reported that those in contemplation were more likely to make stage progression and were similarly active over time as preparers. These observations are not consistent with predictions from the Transtheoretical Model.

Several researchers have also begun to find differences in some of the determinants of exercise based upon stages of change (Booth et al., 1993; Blalock et al., 1996; Courneya, 1995a; 1995b; Gauvin, 1990; Godin et al., 1986; Godin et al., 1995; Lee, 1993; Myers & Roth, 1997; Wyse, Ashford, Buxton & Gleeson, 1995), however, few studies have been conducted to date examining these differences and only a limited number of constructs have been examined in terms of their relationship with the stages of change. Much of the research has focused on the relationship between the stages of change and psychological constructs. The relationship between stages of change and the diversity of determinants for exercise is not known. In addition, much of this research has been quantitative in nature. Leith and Shaw (1997) suggest that to understand involvement and non-involvement in physical activity, not only must factors associated with participation be identified, but the ways in which they are experienced by individuals must also be considered. They suggest that identifying factors may simplify our understanding of the behavior and that there is a "need to take personal experiences and social interpersonal factors, as well as the conflicting nature of these factors into account" (p.360) in understanding physical activity involvement. The strength of utilizing qualitative approaches in examining exercise behavior is that it will assist in explicating experiences and providing in-depth descriptions of experiences that may assist in uncovering the complexities of exercise behavior.

1.3 Enjoyment and Exercise

Studies utilizing the Transtheoretical Model to study exercise essentially fall within a health-behavior perspective of exercise. As such, exercise is approached in a comparable way to other health-related behaviors. Physical activity, however, constitutes a leisure behavior as well as a health behavior. Studies of physical activity participation

have demonstrated that individuals participate for reasons other than for the health benefits associated with physical activity. Individuals report participating for a variety of reasons including both extrinsic and intrinsic factors such as body-related motives (e.g. appearance, fitness), social motives, competence-related motives and enjoyment (Heck & Kimiecik, 1993; Oman & McAuley, 1993; Ryan, Frederick, Lipes, Rubio & Sheldon, 1997, Frederick & Ryan, 1993). As a result, it becomes important to consider motives behind participation and concepts such as enjoyment and intrinsic motivation in understanding physical activity involvement.

One factor that has been suggested as being important for involvement in physical activity is enjoyment (Heck & Kimiecik, 1993; Wankel, 1993). Research in the area of sport and exercise psychology has suggested that enjoyment is important in motivating involvement in physical activity (Heck & Kimiecik, 1993; Scanlan & Simmons, 1992; Wankel, 1993). Youth sport studies have indicated that enjoyment is a major reason for participating and lack of enjoyment is an important reason for dropping out of sport programs (Gould & Horn, 1984). Some studies have also demonstrated that enjoyment is important for involvement in exercise (Heck & Kimiecik, 1993; Ingledew, Markland & Medley, 1998; Oman & McAuley, 1993; Ryan, Frederick, Lipes, Rubio & Sheldon, 1997; Sallis et al., 1989) and that lack of enjoyment is a reason for non-participation (Leith & Shaw, 1997).

Several studies have investigated the motives or reasons for participation in exercise. These studies have found that motives differ based upon type of activity, sex of participant and adoption versus maintenance of activity. Interest/enjoyment and competence have been found to motivate participants in individual sports, whereas individuals in fitness-related activities have been found to be motivated by body-related motivation (e.g. appearance, fitness) (Frederick & Ryan, 1993; Ryan, Frederick, Lipes, Rubio & Sheldon, 1997). Body-related concerns have been found to be more salient for women than men, whereas competence motives have been found to be more salient for men (Frederick & Ryan, 1993). Health and body-related outcomes have been found to be the primary reason given by individuals in beginning an activity program, however, enjoyment, competence and social factors have been found to be important for continued

involvement (Heinzelmann & Bagley, 1970; Inglehew, Markland & Medley, 1998; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997; Siegel, Johnson & Newhoff, 1988; Wankel, 1985).

1.3.1 Intrinsic Motivation and Enjoyment

The study of enjoyment has largely been pursued within the context of intrinsic motivation. Within the social psychological literature, research in the area of motivation has attempted to identify generic aspects of the initiation and regulation of behavior. In particular, the work of Deci and Ryan (1985) has transformed the way in which motivation is conceptualized. Research in the area of motivation has discriminated between intrinsic and extrinsic motivation, with intrinsic motivation defined as behaviors that are “performed out of interest and thus require no ‘reward’ other than the spontaneous experience of interest and enjoyment that accompanies them” (Rigby, Deci, Patrick & Ryan, 1992: p.167). In comparison, extrinsic motivation has been defined as behaviors that are “instrumental, performed for the external rewards or consequences that accrue from their performance” (Rigby, Deci et al., 1992, p.167). While early research viewed these two types of motivation as antagonistic, with extrinsic rewards undermining intrinsic motivation (Deci, 1972; Lepper, Green & Nisbett, 1973), later studies demonstrated that under particular circumstances, extrinsic rewards may enhance intrinsic motivation (Ryan, 1982; Ryan, Mims, & Koestner, 1983). Notable researchers in the field of intrinsic motivation, whose work provides insight into the study of enjoyment and motivation, include Csikszentmihalyi (1975, 1990) and Deci and Ryan (1985).

The work of Csikszentmihalyi and his colleagues (1975, 1990) in studying the phenomenology of experience in creative, enjoyable and intrinsically motivated activities supports the notion that a variety of activities afford common sources of enjoyment. Csikszentmihalyi and his colleagues have found that individuals of different ages, genders, social groups and cultures described similar enjoyable experiences across a wide range of intrinsically motivated activities. Although what particular activity individuals

experienced as enjoyable varied considerably (e.g., rock climbing, dancing, painting, surgery etc.), the reasons given for enjoying the activities were similar.

The experience, which Csikszentmihalyi has labeled "flow", occurs when one undertakes tasks that one perceives oneself to be competent to complete. One must also be able to concentrate and focus completely on the task at hand. This concentration usually results because the activity that has been undertaken has clear goals and feedback. One's involvement is deep but effortless, so much so that one is removed from awareness of the worries and frustration of everyday life. A concern for the self disappears so that there is a loss of self-consciousness. In addition, these enjoyable or "flow" experiences allow one to exercise a sense of control over their actions. Lastly, the sense of the duration of time during these experiences is altered. Csikszentmihalyi (1990) states that "the combination of all these elements causes a sense of deep enjoyment that is so rewarding people feel that expending a great deal of energy is worthwhile simply to be able to feel it" (p.49).

Csikszentmihalyi states that the two theoretically most important dimensions of the experience are skills and challenges. When skills and challenges are in balance, an individual will experience flow. He warns, however, that it is important to not "fall into the mechanistic fallacy and expect that, just because a person is objectively involved in a 'flow activity' he/she will necessarily have the appropriate experience" (1990, p.75). He states that it is the challenges that the individual is aware of and the skills that he/she thinks they have, rather than the "real" challenges and the skills, that influence whether one experiences flow or not. It is one's perceptions of their skills and the challenges of an activity that are key to the flow experience. Although all flow experiences are enjoyable, they are seen as varying in the intensity and complexity of the experience. Csikszentmihalyi views the experience of flow as extending on a continuum from microflow to deep flow. He states, "one can think of flow as a continuum, ranging from repetitive, almost automatic acts to complex activities which require the full use of a person's physical and intellectual potential" (1975, p.54).

Csikszentmihalyi (1975) defined microflow as "the simple unstructured activities that people perform throughout the day; these activities appear to give little positive

enjoyment” (p.54). Microflow results from experiences providing low challenge and requiring low skill. He defined macroflow as “complex, structured activities that produce full-fledged flow experiences” (1975, p.54). Macroflow results from experiences providing high challenges and requiring high skill. He states that the key to flow activities lies in the growth of the self and involves both integration and differentiation. Integration is defined as the extent to which different parts in a system (i.e., the goals, thoughts, feelings and actions of an individual) enhance each other and exist in harmony. Integration leads an individual into seeking out comfortable challenges and enjoying them. Differentiation refers to the degree to which the parts differ in structure and function. It leads individuals to defer immediate enjoyment to undertake more complex and different challenges to develop one’s skills, and pursue different interests and goals which will lead to experiencing greater enjoyment in the future. Deeper flow is experienced as an individual differentiates and integrates and increases in complexity. In this way, enjoyment derived from flow is an essential driving force of personal motivation and growth (Csikszentmihalyi, 1993: 1990).

Similar to the research of Csikszentmihalyi, Deci and Ryan have studied enjoyment in the context of intrinsic motivation and proposed the processes of integration and differentiation to underly human motivation. Deci and Ryan emphasized the importance of self-determination to intrinsic motivation and the experience of enjoyment. Concurrent to Csikszentmihalyi’s program of flow research, Deci, Ryan and colleagues conducted research investigating intrinsic motivation which led to the development of Self Determination Theory (Deci & Ryan, 1985). According to Deci and Ryan (1985), intentional behaviors vary in the extent to which they are self-determined or controlled. Self-determined behaviors are experienced as freely chosen and emanating from the self. Controlled behaviors are experienced as pressured or coerced. Intrinsically motivated behaviors are by definition self-determined as individuals are viewed as acting in accord with their inherent self. Extrinsically motivated behaviors vary in the degree to which they are self-determined depending upon the extent to which they are consistent with one’s sense of self or coerced by an external contingency.

Deci & Ryan (1985) distinguish four types of extrinsic regulation which vary in their degree of internalization. They are defined as follows:

- (1) External regulation: Behaviors that are done for an external inducement
- (2) Introjected regulation: Behavior that occurs when one has taken in a value, but has not fully accepted it, as one's own. This leads to establishing "shoulds" or rules of action that are associated with expectations of self-approval or avoiding guilt or anxiety.
- (3) Identified regulation: One identifies with the importance of the behavior, but there is inconsistency between this and other identifications that may have been internalized.
- (4) Integrated regulation: One experiences organization among various identifications leading to one's actions experienced as personally valued and freely done.

Extrinsic motivation can become self-determined through the organismic process of internalization and integration. "Internalization involves individuals transforming external regulatory processes into internal regulatory processes" (Deci & Ryan, 1994, p.6). Integration is the "process through which these now internalized values and regulations are integrated into one's self" (Deci & Ryan, 1994, p.6). It is assumed that individuals naturally seek to internalize and integrate the regulation of extrinsically motivated behaviors. Extrinsically motivated behaviors are pursued for the importance of achieving an individual's goals whereas intrinsically motivated behaviors are done for their inherent interest and enjoyment.

Self-determination theory also specifies three innate psychological needs that underlie intrinsic and extrinsic motivation. These needs are the need for competence or to function effectively, the need for autonomy or to feel a sense of personal initiative with respect to one's behavior, and the need for relatedness or to feel connected to others. The specification of these needs is important in understanding motivation. It allows for the prediction of variables in the social context that will affect intrinsic motivation. It also

allows for the development of self-determined extrinsic motivation as self-determination theory proposes that the satisfaction of these needs will facilitate integration of extrinsic regulations and intrinsic motivation.

The process of internalization and integration may be more or less effective for any particular regulation. Deci and Ryan (1985) state that many regulations are never integrated and that differences in the degree to which a regulation is internalized is largely a function of whether the environment supports or hinders the integration process. Research has provided evidence that different levels of internalization exist and that social contexts affect motivational processes. Research investigating social-contextual influences on intrinsic motivation has demonstrated that contextual support for autonomy and competence maintains intrinsic motivation. Events experienced as controlling, such as material rewards, evaluations, deadlines and imposed goals, undermine intrinsic motivation whereas events that are autonomy supportive, that encourage self-initiation and choice and provide an optimal challenge, enhance intrinsic motivation (Deci & Ryan, 1985; 1994).

Self-determination theory is based upon an organismic view of the self. An organismic view of the self incorporates two core notions, that human beings are by nature active and that behavior is, in part, regulated by internal structures that are elaborated through experience. Human beings are viewed as having an inherent tendency toward developing increasingly refined and unified psychological structures. This ongoing process of differentiating and integrating one's experience into a unified sense of self is what Deci and Ryan (1985) refer to as "organismic integration". Two processes underlie organismic integration, the differentiation of internal substructures and their integration into a larger, unified structure. "Differentiation involves the exercise of existing capacities in such a way that a relatively global aspect of one's internal structure becomes broken down into more specific elements" (Deci & Ryan, 1985, p.116). Differentiated capacities are not isolated, but rather must be consistent and coordinated for adaptive functioning. Integration represents a holistic tendency within the organism and is the process through which structural synthesis occurs. Separate schemata are viewed as uniting to form a new, superordinate totality. Deci and Ryan (1985) state that

it is the "synthesis of elements into a unified superordinate structure that provides the sense of identity and coherence that we refer to as the self and that is the basis for self-determined functioning" (p.120).

The work of Csikszentmihalyi and Deci and Ryan is similar in that they both relate enjoyment with intrinsically motivated behavior and they propose the processes of integration and differentiation as underlying human motivation. They differ, however, in identifying the factors that will lead to the experience of enjoyment. According to Csikszentmihalyi, enjoyment requires the use of skills and on gradual increments in challenges and is experienced in situations whereby the perceived challenges of the activity match the perceived skills of the individual. Therefore, Csikszentmihalyi emphasizes perceived competence as being important for the experience of enjoyment. Deci and Ryan suggest that the degree of integrated regulation influences the experience of enjoyment, with intrinsically motivated behaviors being experienced as the most enjoyable. The degree of fulfillment of the needs for competence, autonomy, and relatedness are seen as influencing the degree of integration of extrinsic regulations and intrinsic motivation. Thus, Deci and Ryan agree with Csikszentmihalyi that perceived competence is important for enjoyment, but they also suggest the importance of self-determination and relatedness for facilitating the experience of enjoyment.

1.3.2 Sources of Enjoyment

This theoretical research in intrinsic motivation has indicated the importance of enjoyment in the motivation of behavior and has provided some suggestions as to the sources of enjoyment. As enjoyment is considered important for participation in physical activity, the sources of enjoyment in physical activity settings has also been studied. Although understanding the factors that make physical activity enjoyable to the participant may be an important consideration in understanding and enhancing involvement in physical activity, there is a dearth of research investigating the sources of enjoyment in physical activity settings. The studies that have been conducted have generally investigated youth sport contexts. Numerous differences exist in this research (Brustad, 1988; Csikszentmihalyi, 1975; Chalip et al., 1984; Harris, 1984; Ommundsen &

Vaglum, 1991; Wankel & Kreisel, 1985; Wankel & Sefton, 1989) in terms of the operationalization and measurement of the constructs under investigation and the research methodologies used. However, considerable consistencies in findings have emerged. Scanlan & Simons (1992) summarized this research by stating that perceptions of competence, challenge, elements of the activity itself, social interactions and extrinsic rewards have all been identified in several studies as sources of enjoyment in youth sport. The studies conducted to date provide an indication of the relative importance of these factors to the enjoyment of youth sport. Intrinsic factors such as skill development, excitement of the game, displaying competence and perceived challenge, appear to be the most influential sources of sport enjoyment. These factors are followed by social aspects including social interactions, friendship/companionship and being part of a team, and then extrinsic factors such as winning, pleasing others, prestige and external rewards.

Research in the sources of exercise enjoyment is limited with only two studies conducted to date, but it does suggest that there are similarities to the youth sport research, as well as some differences. Heck and Kimiecik (1993) conducted a study investigating the sources of enjoyment among 15 exercise maintainers who were involved in supervised weight training, aerobic dance and aerobic games programs. Using a qualitative approach, Heck and Kimiecik identified six dimensions: social support, environment, flow, competition, emotional and physical outcomes, and outlet and distraction. The social support dimension included both affiliation with others and encouragement from others. Aspects of the environment such as fresh air and the beauty of one's surroundings as well as competition with oneself and others were also considered important to enjoyment. Some elements of the "flow" experience identified by Csikszentmihalyi (1990) were also described by the subjects in this study as contributing to their enjoyment of exercise including losing oneself in the activity, experiencing a natural high, and feelings of control. A number of positive feelings such as a sense of self-satisfaction, feeling good, fun and physical benefits such as the fitness results, were also sources of enjoyment. Other important sources identified by the participants in this study included getting away from work, doing something for oneself, stress reduction and mental relaxation.

Ryan, Frederick, Leps, Rubio and Sheldon (1997) examined the relationship between motivational orientation toward exercise and enjoyment of exercise among a group of new participants to a university fitness centre. Enjoyment levels were not found to differ based upon differences in motives for participation, which included competence, appearance, fitness, enjoyment and social motives. Rather, higher scores on all motive dimensions were associated with greater workout enjoyment. Ryan et al. (1997) suggested that "regardless of the focus of one's initial motive, greater motivation appears to be associated with greater task enjoyment" (p.351). The results of this research suggest that any one particular motive is not more of a source of enjoyment than other motives but rather level of motivation influences the amount of enjoyment experienced. This study extends upon previous research on sources of exercise enjoyment by providing an indication of influences upon levels of enjoyment as well.

1.3.3 Exercise and Enjoyment: A Summary

Research in motivation and exercise enjoyment provide another dimension in understanding physical activity involvement in addressing the many motives, in addition to health reasons, underlying participation in physical activity. The research on enjoyment of exercise is limited in that it has focused on participants in structured exercise programs and those who are already active. Most of the research on physical activity enjoyment, however, has been conducted within the context of youth sport. Only two studies have been conducted to date with adult exercisers (Heck & Kimiecik, 1993; Ryan, Frederick, Leps, Rubio & Sheldon, 1997). These studies investigated sources of enjoyment for active exercisers in fitness activities. It is currently unknown whether individuals in different stages of involvement in exercise experience different levels of enjoyment. In addition, the research on sources of enjoyment in both youth sport and exercise settings indicate that the sources of enjoyment are diverse, involving intrinsic rewards, elements of the activity itself, social aspects and extrinsic rewards. This is significant in that it suggests that enjoyment in physical activity settings is experienced from factors beyond those related to the concept of intrinsic motivation.

1.4 Summary and Purpose of the Present Research

Research to date in the areas of exercise psychology, behavior change and motivation provides insight into understanding involvement in physical activity. The focus of the present research is to utilize both quantitative and qualitative approaches to attempt to integrate aspects of these research areas to gain a greater understanding of involvement in physical activity. In attempting to integrate components of behavior change, motivation and exercise psychology research, this research will include three studies, each addressing different aspects of these areas of research that, when taken together, will attempt to provide additional insight into participation in physical activity.

1.4.1 Study One: A Longitudinal Investigation of the Transtheoretical Model and Exercise

The first study will utilize the health-behavior approach to understanding involvement in physical activity by investigating further the applicability of the Transtheoretical Model to exercise. The purpose of this study will be to provide further evidence of the generalizability of the Transtheoretical Model to exercise behavior. It will examine the relationship between the stages of change and the processes of change, self-efficacy and decision balance, both cross-sectionally and longitudinally, in order to clarify discrepancies existing in the research undertaken to date. Several studies to date have investigated the applicability of the Transtheoretical Model to exercise and have examined the relationship between the processes of change, decision making, self-efficacy and the stages of change for exercise behavior (Gorely & Gordon, 1995; Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992; Marcus, Rossi et al., 1992; Marcus, Selby et al., 1992). Although the results of these studies were similar with respect to decision-making variables and self-efficacy, differences existed in the number of processes of change considered important for involvement in exercise, and in naturally occurring stage movement over time. Much of this research has been cross sectional in nature. Use of a longitudinal design in the present study in examining the Transtheoretical Model's stages and processes of change has the advantage of revealing

the temporal dimension of the change process that has not been possible with cross-sectional research.

The specific objectives of this study are:

(1) To determine whether frequency of use of all processes of change differ between individuals representing various exercise stages of change:

(2) To determine whether changes in process use over time are related to changes in exercise stage of change movement over time;

(3) To investigate naturally occurring exercise stage movement over time;

(4) To determine whether self-efficacy levels and decision-balance measures differ between individuals representing various exercise stages of change and stage movement patterns over time.

1.4.2 Study Two: An Exploratory Investigation of Barriers and Facilitators of Exercise across the Stages of Change

The purpose of this study will be to examine the facilitators and barriers to involvement in physical activity for individuals representing the different stages of change for exercise. Research investigating the determinants of physical activity involvement has demonstrated that a variety of factors are associated with participation in physical activity. However, much of this research has not investigated the potential differences in determinants and their importance at various stages of involvement in physical activity. In reviewing the determinants of physical activity literature, Dishman and Sallis (1994) state " a continuing shortcoming of the determinants research is that virtually all studies focus on the maintenance/dropout phase or do not discriminate between maintenance and adoption" (p.215).

The work of Prochaska, Marcus and colleagues on the Transtheoretical Model to date suggests that behavior change is a dynamic process occurring in a series of stages, with different factors being important at different stages of the change process. Research to date applying the Transtheoretical Model to exercise suggests that it may be helpful in addressing the criticism of exercise psychology research for treating physical activity involvement as a dichotomous variable, involving those that are active and those that are

not, rather than as a dynamic process involving many different levels of involvement over time. As Courneya (1995b) suggests, there is a need to study additional constructs beyond those already incorporated into the Transtheoretical Model to assist in developing a model of exercise behavior change that identifies the most important variables for each stage transition.

In addition, Leith and Shaw (1997) suggest that to understand involvement and non-involvement in physical activity, not only must factors associated with participation be identified, but the ways in which they are experienced by the individuals must be considered. They suggest that identifying factors may simplify our understanding of the behavior and that there is a “need to take personal experiences and social interpersonal factors, as well as the conflicting nature of these factors into account” (p.360) in understanding physical activity involvement.

The specific objectives of this study are:

(1) To investigate similarities and differences in factors identified by individuals at different stages of the behavior change process that facilitate or constrain involvement in physical activity to gain a greater understanding of differences in determinants for each stage transition:

(2) To explore the context in which these factors are experienced by individuals at different points in the stage of change continuum to gain a more in depth understanding of how these factors are experienced.

1.4.3 Study Three: An Exploratory Investigation of the Sources and Levels of Physical Activity Enjoyment across the Stages of Change

The third study will approach understanding physical activity involvement as a leisure behavior in which individuals are seen to participate for a variety of reasons, including enjoyment. The purpose of this study will be to explore the levels and sources of enjoyment for exercise for individuals representing the different stages of change.

Although enjoyment is associated with involvement in exercise, it is still unknown as to whether individuals at different stages of exercise experience different levels of enjoyment. In addition, the research on exercise enjoyment is limited in that it

has focused on participants in fitness activities and those who were active. More research is required on individuals involved in other physical activity contexts and who are at different levels of involvement in physical activity. According to Heck and Kimiecik (1993), "the factors that make exercise enjoyable in the early stages of exercise behavior (e.g. exercise initiation) may not be the same as the later stages of exercise behavior (e.g. exercise maintenance)" (p.19). Heck and Kimiecik (1993) further state that "future work may need to take more of a stages-of-change approach in examining exercise enjoyment to determine the mechanisms underlying this vital component of human experience at different stages of exercise behavior" (p.19). If enjoyment is important for physical activity participation, then investigating the sources of enjoyment across a variety of activity settings and levels of involvement may provide suggestions on how enjoyment can be facilitated in physical activity settings to enhance participation and adherence.

The specific objectives of this study are:

- (1) To examine the relationship between enjoyment and the stages of change to determine if individuals at different stages experience different levels of enjoyment:
- (2) To explore the sources of enjoyment of physical activity for individuals at various stages of involvement in physical activity.

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CHAPTER 2

A Longitudinal Investigation of the Transtheoretical Model and Exercise

2.1 Introduction

Although regular involvement in physical activity has been associated with numerous physical and psychological health benefits (Bouchard, Shephard & Stephens, 1994; Bouchard, Shephard, Stephens, Sutton & McPherson, 1990; Martinsen & Morgan, 1997; Raglin, 1997; Sonstroem, 1997), significant numbers of individuals are not sufficiently physically active to realize these benefits. Population prevalence data on physical activity involvement indicates that in developed countries, between 30 and 60 per cent of adults are sedentary and of those who do begin physical activity programs, typically 50 per cent drop out within the first three to six months (Bauman, 1992; Canadian Fitness & Lifestyle Research Institute, 1997; Dishman, 1990; Owen & Stephens, 1987; Stephens & Casperson, 1994; Stephens & Craig, 1990). As a result, physical activity is considered an important target behavior for the health promotion movement. In an attempt to address this concern, research in the area of exercise psychology has been undertaken to more fully understand exercise behavior.

Research in exercise psychology has investigated the correlates or determinants of physical activity participation and the effectiveness of interventions to facilitate physical activity involvement. Several reviews of this literature have been conducted (Dishman, 1990;1991; Dishman & Sallis, 1994; Dishman, Sallis & Orenstein, 1985; Godin, 1994; Sallis & Hovell, 1990, Sonstroem, 1988; Wankel, 1987; Willis & Campbell, 1992). These reviews have indicated that there are many factors influencing involvement in physical activity including personal, situational and environmental factors, and that a number of cognitive and behavioral interventions have been found to increase the frequency of physical activity, with typical effect magnitudes ranging from 10 to 35 per cent over 3 week to six month intervention periods. This research, however, has been criticized as treating involvement in physical activity as an all-or-non variable. Recently,

it has been suggested that physical activity participation should be conceptualized as a more dynamic process, involving different cognitive and behavioral transition points or stages that individuals progress and regress through. It has been suggested that the determinants of adopting exercise are not necessarily the same as those involved in the maintenance of physical activity participation or in resuming involvement after dropping out. Taking these differences into consideration may improve the effectiveness of behavior change interventions in increasing involvement in physical activity (Sallis & Hovell, 1990; Dishman & Sallis, 1994).

One model that considers the dynamic nature of the behavior change process is the Transtheoretical Model of Behavior Change (Prochaska, 1979). The Transtheoretical Model was developed from behavior change research in clinical psychology settings with addictive behaviors and has since been adapted and applied to the study of self-regulation in physical activity.

2.2 The Transtheoretical Model and Exercise

Four constructs have been consistently investigated in applications of the Transtheoretical Model to exercise: the stages of change, the processes of change, self-efficacy and decision-making.

2.2.1 Stages of Change

Through their research on smoking cessation, Prochaska and his colleagues discovered that change unfolds through a series of stages. Five stages of change have been identified and defined according to the individual's intentions and behaviors regarding the targeted area of behavior change. In measuring the stages of change, the criterion often used to define the adoption of exercise is participation in activity three or more times per week for a minimum of 20 minutes per session (Marcus, Eaton, Rossi & Harlow, 1994). The five stages of change for exercise are defined and assessed as follows (adapted from DiClemente, Prochaska, Fairhurst, Velicer, Velasques & Rossi, 1991; Marcus, Eaton, Rossi & Harlow, 1994):

Precontemplation: Not engaged in exercise or intending to engage in exercise
"I currently do not exercise and I do not intend to start exercising in the next six months"

Contemplation: Not engaged in exercise, but seriously considering it within the next six months

"I currently do not exercise but I am thinking about starting to exercise in the next six months"

Preparation: Considering beginning to exercise within the next month and have made some small behavioral changes already

"I currently exercise some but not regularly"

Action: Began to exercise within the past six months

"I currently exercise regularly but I have only begun doing so within the last six months"

Maintenance: Changed behavior and have maintained it for more than six months

"I currently exercise regularly and I have done so for longer than six months"

It is proposed that individuals will move through each of the stages in making successful behavior change, although progression through the stages does not necessarily occur in a linear manner. Rather, individuals may progress and regress through the stages several times before successful change is achieved. As well, although the potential for change exists, individuals may remain at certain stages for considerable lengths of time. In utilizing the concept of stages of change, the Transtheoretical Model views behavior change as a dynamic, ongoing process.

Several researchers have examined stage pattern movements in exercise over time. Armstrong, Sallis, Hovell and Hofstetter (1993) indicated that a significantly higher percentage of contemplators than precontemplators were found to enter action (46% vs. 25%) and maintenance (25% vs. 6%) post-baseline confirming that initial stage

is important in determining the amount of subsequent progress through the stages of change. Marcus, Simkin, Rossi and Pinto (1996) reported that over a six-month time period, individuals were found to progress, regress and remain stable in exercise stage of change. They indicated that more individuals remained in a stable stage pattern (59%) than changed stages (41%). Of those who were originally sedentary at baseline (54%), the majority remained sedentary (32%). Of those inactive who became active, most were in contemplation at baseline (70%) although there were individuals in a six-month period that progressed from precontemplation to adopting activity indicating that progression through the stages may occur in a relatively short period of time. Fewer individuals became sedentary (15%) than adopted activity (26%). Of those who were originally active at baseline (46%), the majority remained active (27%). The majority of those who relapsed from being active regressed only to the contemplation stage (76%) suggesting that those who were involved in exercise tend to want to become involved again. The results of the research conducted by Armstrong and colleagues (1993) and Marcus and colleagues (1996) provide evidence of the applicability of the stage of change construct to exercise. Individuals were found to progress, regress and remain stable in stage of change as suggested by the Transtheoretical Model. In addition, those in contemplation were more likely to enter action and maintenance over time than were those in precontemplation.

The findings of research conducted by Cardinal (1997) did not fully support the stage of change movement proposed by the Transtheoretical Model. Cardinal (1997) reported that baseline stage was a significant predictor of progression in stage of exercise at both one and seven month follow-ups, but that those in preparation were less likely to progress and were not involved in higher levels of exercise than those in contemplation.

Whether exercise stages of change exist is an issue of debate. The stage variable was identified from initial research interviewing individuals who had quit smoking on their own. Individuals identified progressing through certain stages in changing their behavior. The identification of these stages has been criticized as categorizing an ongoing process into discrete categories (Bandura, 1997; Davidson, 1998; Weinstein, Rothman & Sutton, 1998). Weinstein and colleagues (Weinstein, Rothman & Sutton,

1998) have questioned the existence of the stage of change construct. They propose that stage models need to be carefully examined to determine whether the underlying variable is a continuum with stages of change simply being the creation of stage-like categories, or pseudostages, that involve the arbitrary placement of stages along this continuum. Bandura (1997) has criticized the stage concept converting what is labeled the basic processes of behavior change (adoption, generalization, relapse and recover, and maintenance) into discrete, descriptive categories. However, the basic processes referred to by Bandura provide a structure for change which has many similarities to the stages of change identified by Prochaska and colleagues. Prochaska and colleagues, however, have included the development of intention to undertake a certain behavior as a facet of change as well. Both Bandura and Prochaska emphasize the importance of considering the determinants for each aspect of change. Prochaska and DiClemente (1998) argue that discrete stages are used to integrate continuous processes underlying behavior change, and stage categories are not intended to substitute continuous processes.

A potential contribution of the Transtheoretical Model to the study of exercise involvement is its consideration of these facets of change. Much of the research in exercise psychology has studied involvement in physical activity as an all-or-none variable. One is either active or not active. This research has been criticized for not taking into consideration the dynamic nature of the change process. In using the stage of change construct for conceptualizing the dynamic nature of the change process, the first question that arises is whether different facets of change exist for exercise behavior. The stages of change identified by the research of Prochaska and colleagues were identified from qualitative research that involved interviewing smokers who had quit smoking. Individuals were asked to elaborate upon the process of quitting smoking retrospectively and it was found that individuals commonly structured their overall behavior change into a series of stages. No comparable study has been conducted in exercise behavior to determine if individuals view their behavior change as occurring through a series of stages. More research is required in the exercise domain to determine the validity of the stage construct and to clarify discrepancies in research to date in terms of the patterns of stage movement over time.

In addition, although much of the research employing stage of change measures in exercise do categorize individuals into stages, there is a question as to the appropriateness of the stage measure employed. Stage of change measures currently employed categorize individuals into stages based upon the presence of intention to exercise and behavioral frequency and duration, with those in precontemplation and contemplation defined in terms of both intention and behavior, and those in the other three stages defined by the behavioral dimension. The criteria for regular exercise is participation in activity three or more times per week for a minimum of 20 minutes per session. Recently guidelines for physical activity (Health Canada, 1998), however, have been altered to take into consideration the health benefits associated with overall amounts of daily activity at a variety of intensities. This provides a challenge for establishing a criteria for the adoption of physical activity. In addition, a number of other questions may be asked with respect to the measurement of the stages of change. For example, it may be questions whether maintainers and adopters differ only on the length of time of involvement in regular exercise alone or whether there are other factors that distinguish between those individuals who begin to exercise and those who have been regularly active for longer periods of time. In addition, there may be individuals who are active on an irregular basis who are content with their current activity levels and there may be those who are active on an irregular basis who are not content and intend to be more regularly active.

Much of the exercise adherence research has focused on measuring frequency of behavior as the outcome variable. The Transtheoretical Model draws attention to different facets of change by considering involvement patterns over time and suggests rethinking the way in which the outcome variable is assessed. It draws attention to considering not only quantitative measures of behavior, but as well considering changes in psychological constructs in assessing progress in the behavior change process. In this way, the stage of change construct may assist in further elucidating the behavior change process for exercise.

2.2.2 Processes of Change

The second core construct of the Transtheoretical Model is the processes of change. The processes of change have been defined as the "covert and overt activities that individuals use to modify problem behaviors " (Prochaska, Velicer, DiClemente & Fava, 1988, p.520). Prochaska and his colleagues not only reviewed the major systems of therapy, but studied therapy-directed changers and self changers as well in identifying and investigating the processes of change, (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). Prochaska and his colleagues have identified ten processes of change. The processes of change have been classified both conceptually and empirically, through confirmatory factor analysis, into two categories, the experiential or covert processes and the behavioral or overt processes. The five experiential processes are derived from the traditions of cognitive psychology and involve an experiential restructuring component while the five behavioral processes derive from the behavioristic traditions of psychology and involve more specific and observable behaviors (Prochaska, Velicer, DiClemente & Fava, 1988). The ten processes of change have been defined and categorized as follows: (Prochaska, Norcross, Fowler, Follick & Abrams, 1992, p.37)

Experiential Processes

Consciousness Raising: Increasing information about self and problem.

Self-reevaluation: Assessing how one feels and thinks about oneself with respect to a problem.

Dramatic Relief: Experiencing and expressing feelings about one's problems and solutions.

Environmental Reevaluation: Assessing how one's problems affect physical environment.

Social Liberation: Increasing alternatives for nonproblem behaviors available in society.

Behavioral Processes

Self-liberation: Choosing and commitment to act or believe in ability to change.

Counterconditioning: Substituting alternatives for problem related behaviors.

Stimulus Control: Avoiding stimuli that elicit problem behaviors: adding stimuli that encourage alternative behaviors.

Reinforcement Management: Rewarding oneself or being rewarded by others for making changes.

Helping Relationships: Being open and trusting about problems with someone who cares.

Prochaska and his colleagues discovered that the “concept of stages was the key to relating all the various change processes from theoretically incompatible systems of psychotherapy in a coherent fashion” (Prochaska, Norcross & DiClemente, 1994, p.38). Prochaska and his colleagues noted a systematic relationship among the stages and processes of change (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983; Prochaska, DiClemente, Velicer, Ginpil & Norcross, 1985). Several studies have investigated the relationship between the stages and processes of change for exercise.

Marcus, Rossi, Selby, Niaura and Abrams (1992) developed a processes of change questionnaire for exercise that adapted many of the items from the measure developed for smoking. A 39-item paper and pencil questionnaire was developed, with statements representing each of the ten processes of change. Subjects were instructed to think back over the past month and rate the frequency of occurrence of each item on a five-point Likert scale (1=never to 5=repeatedly). In the initial study investigating the integration of the stages and processes of change for exercise, Marcus, Rossi, Selby, Niaura and Abrams (1992) reported that subjects in different stages used the processes of change in significantly different ways. Those in the precontemplation stage used all ten processes of change less than did subjects in the other stages. Differences between the contemplation and preparation stages in the use of the experiential processes were not significant, but use of these processes tended to peak in the action stage. Three of the experiential processes, self-reevaluation, environmental reevaluation and dramatic relief, were used more in the action stage than in maintenance. Use of the behavioral processes

increased from the precontemplation to action stages. Self-liberation, reinforcement management and counterconditioning were used significantly more in preparation than in contemplation. In addition, use of all five behavioral processes increased significantly between preparation and action. Frequency of use of the behavioral processes did not significantly differ between action and maintenance.

Gorely and Gordon (1995) also examined the integration of the stages and processes of change with a sample of 583 older adults aged 50-65 years. Those in the precontemplation stage used each of the processes significantly less than those in the other stages of change. The experiential processes of consciousness raising and self-reevaluation were found to increase from preparation to maintenance. Use of the behavioral processes of counterconditioning and self-liberation increased from contemplation to preparation to action, while use of stimulus control increased from preparation to maintenance. Although these results are generally similar to the findings of Marcus and her colleagues, some inconsistencies were noted in that only five processes were found to differentiate stages of change beyond the precontemplation stage as a result of discriminant function analysis.

Marcus, Simkin, Rossi and Pinto (1996) investigated process use among subjects maintaining, adopting, and relapsing from exercise involvement. Individuals' stage and processes of change were assessed at baseline and at a six-month follow-up among 314 employees of a retail outlet and industrial manufacturer. Based upon stage of change assessments, individuals were categorized as exercise adopters, relapsers, the sedentary stable and the stable actives. Change in process use was assessed using MANOVA with follow-up univariate analyses for each group. Marcus, Simkin and colleagues reported that the stable profiles were associated with no significant change in process use, use of all of the processes except social liberation increased for the group of adopters, and use of all behavioral processes and one experiential process, dramatic relief, decreased significantly for the relapse group.

The Transtheoretical Model is an integrative model identifying ten processes of change emanating from divergent theories that are utilized in the behavior change process. This aspect of the model has been criticized (Bandura, 1997) as amalgamating

behavior change strategies that are theoretically incompatible. However, by providing empirical evidence across behaviors and populations that ten processes are used in the behavior change process by both self-changers and those in formal change programs, the Transtheoretical Model challenges theorists who propose that behavior change is attributable to only limited subsets of these processes. A major potential contribution of this model to the study of physical activity involvement is its capacity to bridge diverse approaches to behavior change from behavioral and cognitive psychology traditions. However, although there have been consistencies in the research to date providing support for the use of the processes of change, discrepancies in research findings also exist.

Prochaska & Velicer (1997) indicate that more research is required on the use of the processes of change across behaviors as there have been inconsistencies in findings to date as to how many processes and which processes are used across behaviors. In the area of exercise, Marcus, Rossi and colleagues (1992) indicated that ten processes of change were utilized in the behavior change process. Gorely and Gordon (1995) however, reported that only five processes made significant contributions to the movement across stages for exercise. In a longitudinal design, Marcus, Simkin, Rossi and Pinto (1996) indicated that use of nine processes were associated with the adoption of behavior, while only six processes were associated with relapse. Further research is required to clarify these discrepancies

2.2.3 Self-Efficacy and Decision Making

One area of consistency in the research investigating the application of the Transtheoretical Model to exercise has been with respect to self-efficacy and decision making variables. In both cross-sectional and longitudinal studies, self-efficacy has been found to be related to stage of change in a manner consistent with findings in the area of smoking cessation (Gorely & Gordon, 1995; Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Selby, Niaura, & Rossi, 1992; Wyse, Mercer, Ashford, Buxton, & Gleeson, 1995). Maintainers have demonstrated the highest efficacy scores while precontemplators and contemplators have the lowest. In addition, individuals with

higher self-efficacy scores have been found to be more likely to participate in physical activity six months after the initial assessment.

The perceived pros and cons of exercise have also been found to be related to stage of change in a theoretically consistent manner in both cross-sectional and longitudinal studies. The pros of exercise tend to increase from precontemplation to maintenance, the cons decrease from precontemplation to maintenance, and the cross-over in the relative prevalence of the two occurs in the preparation stage (Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992). Precontemplators place greater emphasis on the negative aspects of exercising, while maintainers place greater emphasis on the positive aspects of exercise.

2.3 Purpose of the Study

The overall purpose of this study was to investigate further the applicability of the Transtheoretical Model to exercise using both cross-sectional and longitudinal designs. This study examined the relationship between the stages of change and the processes of change, decision making and self-efficacy to clarify discrepancies in the research undertaken to date and provide further evidence for the generalizability of the model to exercise. In particular, this study had four objectives.

The first objective of this study was to examine use of the processes of change between individuals representing various exercise stages of change to determine if use of all processes of change differed across the stages of change. Marcus, Rossi, and colleagues (1992) reported significant differences in use of all ten processes of change across the stages of change. Gorely and Gordon (1995) however, reported that only five processes made significant contributions to the movement across stages. This study attempted to provide further evidence to clarify this discrepancy in process use for exercise.

The second objective of this study was to determine whether changes in process use over time were related to changes in exercise stage movement over time. This study utilized a longitudinal design in order to examine changes in the use of the processes of time. The one longitudinal study to date that has examined changes in process use over

time (Marcus, Simkin, Rossi & Pinto, 1996) reported that all processes, except social liberation, influenced the adoption of exercise, while only six processes influenced relapse. This is the only study to date examining longitudinal use of processes of change. The present study replicated the study conducted by Marcus and colleagues (1996) to provide further evidence of the generalizability of the Transtheoretical Model. The present study also extended upon the study conducted by Marcus and colleagues (1996) by incorporating both six-month and twelve-month longitudinal data in assessing the relationship between the stages and processes over time.

The third objective of this study was to determine the naturally occurring stage movement patterns over time. This study investigated the dynamic nature of the change process by examining the patterns of involvement in exercise over time. Discrepancies exist in longitudinal studies investigating naturally occurring stage movement over time. As proposed by the Transtheoretical Model, Armstrong and colleagues (1993) and Marcus and colleagues (1996) reported that those in contemplation were more likely to enter action and maintenance over time than were those in precontemplation. Contrary to the Transtheoretical Model, however, Cardinal (1997) reported that those in contemplation were more likely to make stage progression and were as active over time as were preparers. This study provides further longitudinal data examining stage of change patterns. This will help to clarify previous discrepant results. As well, this research extends upon previous research which has been restricted to six-month follow-up periods, by providing both six-month and twelve-month follow-up data.

The fourth objective of this study was to determine whether self-efficacy levels and decision balance measures differ between individuals representing various exercise stages of change and stage movement patterns over time.

The following hypotheses were investigated.

- Over time, individuals were expected to represent both progression and regression through the stages of change. Individuals may remain at certain stages for considerable amounts of time before change occurs. Initial stage will be important in

determining the amount of progress through the stages of change over time. Most individuals who adopt regular exercise over time will indicate being in preparation prior to taking action. Fewer contemplators and even fewer precontemplators will enter the action and maintenance stages. Most individuals who relapse from regular activity will return to the contemplation stage.

- Individuals representing different stages of change will differ in their use of the ten processes of change. Inactive individuals will use the processes of change less than preparers who will use the processes of change less than active individuals. Change in process use will be related to stage movement. Stability in process use will be related to stage stability. Individuals who stay in sedentary or active stages will not change their use of the processes of change over time. Individuals who demonstrate stage progression will increase their frequency of use of the processes over time. Individuals who demonstrate stage regression will decrease their use of the processes of change over time.
- Individuals representing different stages of change will differ in levels of self-efficacy. Inactive individuals will have lower self-efficacy than preparers who will have lower self-efficacy than active individuals.
- Individuals representing different stages of change will differ in their decision-balance ratings. The pros of exercise will be rated lower by inactives than preparers and greater by actives than preparers and inactives. The cons of exercise will be rated lower by actives than preparers and greater by inactives than preparers. Actives and preparers will rate the pros of exercise as greater than the cons, with this difference being greater for active individuals. Inactive individuals will rate the cons of exercise greater than the pros.

2.4 Methods and Procedures

2.4.1 Design of the Study

The data utilized for this study was collected as part of a broader research project examining physical activity involvement (Appendix A). The variables of interest for this study were the stages of change, processes of change, decision making and self-efficacy. Several phases of data collection were conducted. The data for the present study was collected at six-month intervals over a 12-month period from May 1993 to May 1994. These three phases are outlined below and presented in Table 2-1.

Phase One of Data Collection

A random sample of 800 employees of a large medical institution was drawn from an employee list provided by the institution's personnel department. A questionnaire (Appendix B) assessing the stages of change, processes of change, demographic variables, and exercise behavior information, along with a cover letter assuring confidentiality and a brief explanation of the study's purpose (Appendix C), was mailed through the hospital mailing system to all subjects chosen through a computerized random sampling technique conducted by the hospital administration. In order to maximize the response rate, a return envelope was included to simplify the process of returning the questionnaires by mail. In addition, a follow-up letter (Appendix D) was mailed two weeks after the questionnaire to thank early responders and to remind non-responders to return the questionnaire.

Phase Two of Data Collection

Stages of change and processes of change were assessed again with a questionnaire (Appendix E) that was mailed, along with a cover letter (Appendix F), through the hospital mailing system to all subjects who completed the first phase of data collection. Respondents were also asked to indicate if they would be willing to be interviewed and an informed consent form was provided (Appendix G). A return

envelope was included to simplify the process of returning the questionnaires by mail. A follow-up letter (Appendix H) was mailed two weeks after the questionnaire was distributed in order to thank early responders and to remind non-responders to return the questionnaire.

Phase Three of Data Collection

Stages and processes of change, as well as self-efficacy and decision balance, were assessed at phase three with a questionnaire (Appendix I), that along with a cover letter (Appendix J) was mailed to all employees who completed the second phase of data collection. A return envelope was included to simplify the process of returning the questionnaires and consent forms by mail. A follow-up letter (Appendix K) was mailed two weeks after the questionnaire was distributed in order to thank early responders and to remind non-responders to return the questionnaire.

The initial phase of data collection was conducted for the completion of a Master's thesis (Hills, 1993). The sample size of 800 was chosen so that sufficient numbers of individuals representing the five stages of exercise behavior change would be obtained to conduct the data analysis for this initial study. Upon completion of the Master's thesis, it was decided to expand and continue the study, assessing the stages and processes of change of the original respondents over time to examine longitudinal patterns. Six-month intervals were chosen as the assessment time frame as this was the time frame proposed by Prochaska and colleagues in which individuals think about changing their behavior and in which most individuals relapse from the adoption of behavior (Prochaska & DiClemente, 1983). As such, it was believed that this time frame was sufficient to capture changes in intentions and behaviors and thus stages of change. It was decided to conduct a six-month and 12-month follow-up assessment of stages and processes of change in order to extend upon research to date with respect to longitudinal patterns and use of the stages and processes of change for exercise which has involved a six-month follow-up only.

Table 2-1
Data Collection Phases
Self-Efficacy, Decision Balance, Stages & Processes of Change

PHASE ONE	PHASE TWO	PHASE THREE
May 1993	November 1993	May 1994
N=407	N=123	N=68
Questionnaire	Questionnaire	Questionnaire
- Stages of Change - Processes of Change - Demographics	- Stages of Change - Processes of Change	- Stages of Change - Processes of Change - Self-efficacy - Decision balance

2.4.2 Instruments

2.4.2.1 Stages of Change for Exercise Behavior

The stages of change were assessed using Marcus, Eaton, Rossi and Harlow's (1994) Stages of Change questionnaire. Two-week, test-retest reliability with male and female employees of a medical centre was .78 (Marcus, Selby, Niaura & Rossi, 1992). Evidence for the construct validity of this measure has been presented in that it has been related to the processes of change (Marcus, Rossi, Selby, Niaura & Abrams, 1992), decision making and self-efficacy in a manner consistent with theory (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992; Marcus, Selby, Niaura & Rossi, 1992; Marcus, Eaton, Rossi & Harlow, 1994). Marcus & Simkin (1993) demonstrated the concurrent validity of this measure with the Seven-Day Physical Activity Recall Questionnaire as univariate tests revealed significant between-group differences for vigorous and moderate activity indicating that the stage of change measure is associated with another measure of physical activity. Marcus, Eaton, Rossi and Harlow (1994) suggested that a shortened version of their questionnaire could be used in future studies in order to increase the numbers of individuals able to be categorized by the measure. In this study, a shortened version of this questionnaire was designed in which individuals are presented with five statements corresponding to each of the stages of change and respondents were asked to pick a statement that best describes their current exercise

behavior(Appendix L). Cardinal (1995; 1997) reported a test-retest reliability of $r=.93$ to 1.00 for this shortened version of the stage of change measure.

2.4.2.2 Processes of Change

The processes of change were assessed using Marcus, Rossi, Selby, Niaura and Abrams (1992) Processes of Change Questionnaire for exercise (Appendix M). This questionnaire consists of 39 items measuring ten processes of change. Four items comprised a subscale for each process, except dramatic relief in which the subscale was comprised of three items. The respondents were asked to indicate the frequency of experiencing the item on a five-point Likert scale (1=never, 5=repeatedly). The Cronbach Alpha coefficients for the processes of change in the present study for each phase are reported in Table 2-2.

Table 2-2
Processes of Change: Internal Consistency

Cronbach Alpha Corefficient

Process	Phase 1 (n=400)	Phase 2 (n=122)	Phase 3 (n=66)
Consciousness Raising	.81	.80	.84
Counterconditioning	.82	.61	.79
Dramatic Relief	.86	.86	.87
Environmental Reevaluation	.78	.82	.79
Helping Relationships	.79	.79	.75
Reinforcement Management	.78	.78	.78
Self Liberation	.72	.68	.70
Self Reevaluation	.86	.85	.80
Social Liberation	.60	.51	.66
Stimulus Control	.61	.71	.61

2.4.2.3 Decisional Balance

The decisional balance was measured using the Decisional Balance Questionnaire (Marcus, Rakowski et al., 1992) (Appendix N). Items were scored on two subscales, the pros or positive aspects of exercise (n=10 items) and the cons or negative aspects of exercise (n=6 items). Participants rated how important each of the statements were on a five-point Likert scale (1=not at all important, 5=extremely important) in their decision to exercise or not to exercise. Marcus, Rakowski et al. (1992) reported internal consistency coefficients of $\alpha = .95$ for the pros subscale and $\alpha = .79$ for the cons subscale when applied to male and female employees of four worksites (retail outlet, industrial manufacturer, government agency, medical centre). The internal consistency coefficients in the present study were $\alpha = .95$ for the pros subscale and $\alpha = .74$ for the cons subscale.

2.4.2.4 Self-Efficacy

Self-efficacy was measured using the Self-Efficacy Questionnaire (Marcus, Selby et al., 1992) (Appendix O). Subjects were asked to assess their confidence to exercise against five items representing barriers or adverse conditions on a five-point Likert scale (1=not at all confident, 5=very confident). Marcus and Owen (1992) reported internal consistency scores for this measure of $\alpha = .85$ and $\alpha = .80$ in two separate studies of employees in Providence, Rhode Island and Australia. The test-retest reliability over a two week period was $r = .90$ (Marcus, Selby, et al., 1992). The internal consistency coefficient in the present study was $\alpha = .86$.

2.4.3 Data Analysis

Both cross-sectional and longitudinal analyses were conducted. Cross-sectional analysis of the first phase of data collection was used for completion of a Masters Degree Thesis (Hills, 1993). The current study was intended to elaborate and extend upon this

initial study by incorporating further data and analyses of this data over a twelve-month period.

2.5 Results

2.5.1 Description of the Sample

2.5.1.1 Response Rate

Of the 800 initial questionnaires that were originally mailed to the employees, 474 were returned. Of these, 67 were returned incomplete, leaving a useful sample of 407 for data analysis for Phase One of the overall research project. In Phase Two, questionnaires were mailed to the 407 subjects who completed the first phase of data collection. Of these, 31 questionnaires were returned incomplete and 123 were returned completed. In Phase Three, questionnaires were mailed to the 123 subjects who completed the second phase of data collection. Of these, 7 subjects returned incomplete questionnaires and 68 continued in the study. The response rate was calculated using the following formula (de Vaus, 1990, p.99):

$$\text{Response Rate} = \frac{\text{Number Returned}}{N \text{ in sample} - (\text{ineligible} + \text{unreachable})} \times 100$$

Based upon this formula and accounting for attrition, the response rates for this study was 65.6% for phase one, 40.9% for phase two and 64.6% for phase three. Several rounds of staff layoffs occurred at the institution during the data collection period which negatively influenced the response rate of this sample.

2.5.1.2 Stages of Change and Demographic Profile of Participants

The stage of exercise behavior change was assessed at phase one (initial baseline), phase two (first follow-up), and phase three (second follow-up) as outlined in section

2.6.1. The stage of change of respondents at the three questionnaire data points is reported in Table 2-3:

Table 2-3
Stage of Change Frequencies & Percentages

<i>Stage</i>	<i>Phase One (Baseline)</i>	<i>Phase Two (6 months)</i>	<i>Phase Three (12 months)</i>
Precontemplation	32 (7.9%)	12 (10.6%)	5 (7.4%)
Contemplation	48 (11.8%)	17 (13.8%)	6 (8.8%)
Preparation	190 (46.7%)	46 (37.4%)	24 (35.3%)
Action	28 (6.9%)	9 (7.3%)	8 (11.8%)
Maintenance	102 (25.1%)	37 (30.1%)	23 (33.8%)
Unclassifiable	7 (1.7%)	1 (0.8%)	2 (2.9%)
Total	407	123	68

Most individuals could be classified into a stage of change using the stage of change measure. At phase one, 7 individuals (1.7%) were unclassifiable. At phase two, one individual (.8%) was not able to be classified into a stage, while at phase three, two individuals (2.9%) were unclassifiable. The relative distribution of individuals across the stages of change was similar at phases one, two and three. Most individuals were in the Preparation and Maintenance stages, while fewer individuals were in Precontemplation, Contemplation and Action. Due to low sample sizes at Phases 2 and 3, some stages were collapsed in order to provide greater power in conducting further statistical analyses. The Precontemplation and Contemplation stages were combined to form an “inactive” group, while the Action and Maintenance stages were combined to form an “active” group. This regrouping of the stage categories was done at all three phases in order to facilitate comparison of results across each phase of data collection. The frequency and percentage distribution of individuals in the reclassified stages are reported in Table 2-4. No significant differences were found between the proportion of individuals in each stage group across the three phases of data collection ($\chi^2=7.49$, $p=.120$).

Table 2-4
Frequency and Percentage of Individuals in Recoded Stage Categories

<i>Stage</i>	<i>Phase One</i>	<i>Phase Two</i>	<i>Phase Three</i>
Inactive	80 (20%)	30 (24.4%)	11 (16.7%)
Preparation	190 (47.5%)	46 (37.8%)	24 (36.4%)
Active	130 (32.5%)	46 (37.8%)	31 (46.9%)
Total	400	122	66

Age and Stages of Change

The average age and age range of individuals for each stage of change category is reported in Table 2-5. Analysis of variance indicated that there were no significant age differences between the stages of change at phase one ($F_{(2,39)}=0.550, p=0.578$), phase two ($F_{(2,12)}=0.152, p=0.859$), or phase three ($F_{(2,65)}=1.071, p=0.349$), although it is interesting to note that the youngest and oldest respondents dropped out.

Table 2-5
Age by Stage of Change: Averages and Ranges

<i>Stage</i>	<i>Phase One</i>	<i>Phase Two</i>	<i>Phase Three</i>
Inactive	46.46 yrs (33-65 yrs)	46.00 yrs (36-58 yrs)	46.70 yrs (36-57 yrs)
Preparation	46.95 yrs (32-65 yrs)	45.26 yrs (33-61 yrs)	44.04 yrs (33-57 yrs)
Active	45.96 yrs (25-64 yrs)	45.11 yrs (33-64 yrs)	43.30 yrs (36-63 yrs)
Total	46.51 yrs	45.37 yrs	44.11 yrs

Gender and Stages of Change

The number of males and females for each stage of change category is reported in Table 2-6. Chi square analysis indicated that there were no significant gender differences between the stages of change at phase one ($\chi^2=3.934$, $p=0.415$), phase two ($\chi^2=0.497$, $p=0.780$) or phase three ($\chi^2=0.394$, $p=0.821$) or between phases ($\chi^2_{\text{males}}=.320$, $p=.976$; $\chi^2_{\text{females}}=8.72$, $p=.090$).

Table 2-6
Frequencies and Percentages of Males and Females by Stage of Change

<i>Stage</i>	<i>Phase One</i>		<i>Phase Two</i>		<i>Phase Three</i>	
	Male	Female	Male	Female	Male	Female
Inactive	11 (13.7%)	69 (86.2%)	4 (13.3%)	26 (86.7%)	1 (9.1%)	10 (90.9%)
Preparation	27 (14.0%)	163 (85.7%)	9 (19.6%)	37 (80.4%)	4 (16.6%)	20 (83.3%)
Active	25 (19.0%)	104 (80.6%)	8 (17.4%)	38 (82.6%)	4 (16.6%)	27 (87.1%)
Total	63 (15.7%)	336 (84.2%)	21 (17.2%)	101 (82.7%)	9 (13.6%)	57 (86.3%)

Occupation and Stages of Change

An overall description of each sample with respect to occupation-related variables is presented in Table 2-7. The sample was initially randomly drawn from the medical institution's employee payroll list and the proportion of the various occupational categories were maintained at six-month and twelve-month follow-ups. Physicians were not included in this payroll list and hence they are underrepresented in this sample. As the primary purpose of this study was to examine differences across the stages of change in a number of exercise determinants and to examine longitudinal patterns, this lack of representativeness is not of major concern. Chi square analyses showed that individuals in the different stage categories (inactives, preparers, actives) at each phase did not differ significantly ($p<.05$) on most occupation-related variables (Appendix R).

Table 2-7
Description of Samples
Frequencies and Percentages of Occupation-Related Variables

Occupation-Related Variable	Phase One (N=400)	Phase Two (N=122)	Phase Three (N=66)
Employed Full-Time	288 (72%)	84 (69%)	44 (67%)
Employed Part-Time	89 (22%)	28 (23%)	14 (22%)
Relief Employee	23 (6%)	10 (8%)	7 (11%)
Shiftwork			
Days	134 (40%)	44 (42%)	22 (40%)
Evenings	89 (26%)	28 (26%)	14 (25%)
Nights	73 (22%)	25 (24%)	14 (25%)
Rotating	42 (12%)	9 (8%)	5 (10%)
< 12 hours	168 (66%)	54 (71%)	28 (70%)
≥12 hours	85 (34%)	22 (29%)	12 (30%)
Occupational Classification			
Support (General & Clerical)	77 (19%)	17 (14%)	6 (9%)
Paramedical Technical/Professional	88 (22%)	33 (26%)	19 (29%)
Nurse	190 (47%)	60 (48%)	32 (48%)
Management	25 (6%)	8 (6%)	6 (9%)
Other	21 (5%)	7 (6%)	3 (5%)

Comparisons of Study Participants and Drop-Outs

Comparisons were then made between those individuals who discontinued participation in this study and those who continued to determine if the study participants differed from the study drop-outs on any of the demographic variables. An overall description of study participants and study drop-outs on all demographic variables is presented in Table 2-8. Chi square analyses revealed that the study participants did not differ significantly ($p < .05$) from the study drop-outs on any of the demographic variables (Appendix S).

Table 2-8
Demographic Profile of Study Participants and Study Drop-outs

Demographic Variable	Phase 2 Participant (N=121)	Phase 2 Drop-Out (N=279)	Phase 3 Participant (N=66)	Phase 3 Drop-Out (N=55)
Age	45.37 yrs	47.5 yrs	44.11 yrs	47.10 yrs
Gender				
Male	21 (17.5%)	45 (16.1%)	9 (13.6%)	12 (21.8%)
Female	101 (83.5%)	239 (85.6%)	57 (86.4%)	44 (80%)
Employed Full-time	288 (72%)	204 (73.1%)	44 (67%)	40 (70.1%)
Employed Part-time	89 (22%)	61 (21.8%)	14 (22%)	14 (24.5%)
Relief Employee	23 (6%)	13 (4.6%)	7 (11%)	3 (5.4%)
Shiftwork				
Days	134 (40%)	90 (38%)	22 (40%)	22 (43%)
Evenings	89 (26%)	61 (26.2%)	14 (25%)	14 (27.5%)
Nights	73 (22%)	48 (20.6%)	14 (25%)	11 (21.5%)
Rotating	42 (12%)	33 (14.2%)	5 (10%)	4 (7.8%)
<12 hours	168 (66%)	114 (64%)	28 (70%)	26 (72%)
≥12 hours	85 (34%)	63 (36%)	12 (30%)	10 (28%)
Occupational Classification				
Support (General & Clerical)	77 (19%)	60 (21.5%)	6 (9%)	8 (14.5%)
Paramedical Technical/Prof.	88 (22%)	55 (19.7%)	19 (29%)	14 (25.5%)
Nurse	190 (47%)	130 (46.6%)	32 (48%)	28 (51%)
Management	25 (6%)	17 (6.1%)	6 (9%)	2 (3.6%)
Other	21 (5%)	14 (5%)	3 (5%)	3 (5.4%)

Analysis of variance determined that no significant differences were found between study participants and drop-outs in terms of age for those who continued or dropped-out at phase two ($F_{(1,405)}=2.725, p=.100$), and those who continued or dropped-out at phase three ($F_{(1,405)}=.175, p=.676$).

A comparison was then made between those that continued participation in the study and those that dropped out based upon stage of change classification at phase one (Table 2-9). Similar percentages were found across all initial stage of change groupings for those that continued in the study and those that dropped-out at phase two ($\chi^2=2.795, p=.593$) and phase three ($\chi^2=1.494, p=.828$).

Table 2-9
Comparison between Study Participants and Study Drop-Outs
Frequencies and Percentages of Initial Stage of Change Group who
Participated and Dropped-Out at Phases Two and Three

<i>Stage of Change: Phase One</i>	<i>Phase 2 Participant</i>	<i>Phase 2 Drop-out</i>	<i>Phase 3 Participant</i>	<i>Phase 3 Drop-out</i>
Precontemplation (n=32)	12 (37%)	20 (63%)	5 (15%)	7 (21%)
Contemplation (n=48)	17 (35%)	31 (65%)	6 (13%)	11 (22%)
Preparation (n=190)	46 (25%)	144 (75%)	24 (13%)	22 (11%)
Action (n=28)	9 (32%)	19 (68%)	8 (28%)	1 (4%)
Maintenance (n=102)	37 (36%)	65 (64%)	23 (22%)	14 (14%)
<i>Total</i>	<i>122 *</i>	<i>279</i>	<i>66*</i>	<i>56</i>

2.5.2 Stages of Change – Longitudinal Patterns of Individuals

The stage of exercise behavior change was assessed at six-month intervals over a twelve-month period for those completing the study. A description of the stage of change patterns across the three data collection periods is presented in Table 2-10.

Table 2-10
Exercise Stage of Change Patterns
Frequencies and Percentages

<i>Stage Pattern</i>	<i>n</i>	<i>%</i>
<u>Stable Actives</u>	16	25%
Maintenance-Maintenance-Maintenance	14	
Action – Action – Action	2	
<u>Stable Preparers</u>	11	17%
Preparation – Preparation – Preparation	11	
<u>Stable Inactives</u>	3	5%
Precontemplation – Precontemplation – Precontemplation	3	
<u>Progressors</u>	14	23%
Precontemplation – Precontemplation – Contemplation	1	
Precontemplation – Precontemplation - Preparation	1	
Contemplation – Contemplation - Preparation	1	
Contemplation – Preparation – Preparation	1	
Contemplation – Preparation - Action	1	
Contemplation – Preparation – Maintenance	1	
Contemplation – Action – Action	1	
Preparation – Action – Maintenance	1	
Preparation – Preparation – Action	3	
Preparation – Preparation – Maintenance	1	
Preparation – Maintenance - Maintenance	1	
Action – Maintenance – Maintenance	1	
<u>Regressors</u>	7	11%
Contemplation – Contemplation – Precontemplation	1	
Preparation – Contemplation – Contemplation	1	
Preparation – Preparation – Contemplation	1	
Action – Contemplation – Contemplation	1	
Maintenance – Contemplation – Contemplation	1	
Maintenance – Preparation – Preparation	1	
Maintenance – Action - Action	1	
<u>Variable</u>	12	19%
Contemplation – Preparation – Precontemplation	1	
Contemplation – Preparation - Contemplation	1	
Preparation – Contemplation – Preparation	4	
Preparation – Action - Preparation	1	
Preparation – Maintenance – Preparation	3	
Maintenance – Preparation – Maintenance	2	

Over the course of 12 months, about half of this sample changed stages (53% progressed/regressed) and half remained stable in their original stage classification over the 12-month period (47%). In terms of stable stage patterns, most individuals

remained in preparation or maintenance. No individuals remained in contemplation. The same two individuals indicated being in action at each phase. Inclusion in the action stage was assessed with the statement, "I currently exercise regularly but I have only begun doing so within the last six months". It is unknown whether these individuals relapsed between assessment periods and began regular activity again prior to each assessment, or whether these individuals misclassified themselves due to measurement or recall error as individuals active for more than six months are expected to be classified as maintainers.

In terms of stage movement, individuals were found to progress, regress and exhibit a pattern of both progression-regression or regression-progression. Patterns were so variable that almost every individual displayed a unique pathway. In terms of progression, some individuals were found to progress to the next stage at six-month intervals, whereas others progressed two stages ahead in a six-month interval. Most of those who progressed became active on a regular basis over the year. A similar but slightly smaller number of individuals remained in preparation (n=11) as those that moved out of this stage (n=16). In terms of regression, most of those who regressed ended up at the contemplation stage at the end of the 12-month period. Of those displaying variable stage pathways, an equal number (n=6) demonstrated a progression and regression or a regression then progression pattern. Of those that progressed then regressed, two individuals started to make efforts to exercise then relapsed, while the other four individuals became regularly active then relapsed. Of those that regressed then progressed, four individuals were doing some activity, stopped but intended to become more active and then started to exercise again. Two individuals were regularly active, relapsed to being irregularly active, then resumed regular exercise.

In addition to examining individual pathways of change, group patterns between each data collection phase were examined. Group stage of change frequencies between each data collection phase are reported in Tables 2-11, 2-12 and 2-13 respectively.

Table 2-11
Stage of Change Frequencies
Phase One – Phase Two

Post-Baseline Stage (Phase 2)

Baseline Stage (Phase 1)	Precontemplation	Contemplation	Preparation	Action	Maintenance	<i>Total</i>
Precontemplation	6	2	3	0	0	11
Contemplation	2	4	6	2	0	14
Preparation	2	9	32	5	5	53
Action	0	1	0	2	3	6
Maintenance	0	1	4	0	28	33
<i>Total</i>	10	17	45	9	36	117

Please note: Totals do not correspond to Table 2-4 due to incomplete data resulting from non-reponse to the stage of change item at either phase.

Table 2-12
Stage of Change Frequencies
Phase Two – Phase Three

Post-Baseline Stage (Phase 3)

Baseline Stage (Phase 2)	Precontemplation	Contemplation	Preparation	Action	Maintenance	<i>Total</i>
Precontemplation	3	1	1	0	0	5
Contemplation	1	3	5	0	0	9
Preparation	1	2	14	4	4	25
Action	0	0	1	3	1	5
Maintenance	0	0	3	1	17	21
<i>Total</i>	5	6	24	8	22	65

Please note: Totals do not correspond to Table 2-4 due to incomplete data resulting from non-reponse to the stage of change item at either phase.

Table 2-13
Stage of Change Frequencies
Phase One – Phase Three

Post-Baseline Stage (Phase 3)						
Baseline Stage (Phase 1)	Precontemplation	Contemplation	Preparation	Action	Maintenance	Total
Precontemplation	3	1	1	0	0	5
Contemplation	2	1	2	2	1	8
Preparation	0	2	19	3	3	27
Action	0	1	0	2	1	4
Maintenance	0	1	1	1	16	19
<i>Total</i>	<i>5</i>	<i>6</i>	<i>23</i>	<i>8</i>	<i>21</i>	<i>63</i>

Please note: Totals do not correspond to Table 2-4 due to incomplete data resulting from non-reponse to the stage of change item at either phase.

Many similarities are evident in examining the stage movement between data collection points. Over both six-month and twelve-month time intervals, only a minority changed exercise stage of change. More individuals remained in their baseline stage of change than moved to other stages. Most precontemplators stayed in precontemplation. Those that did move progressed to contemplation or preparation. Most contemplators moved. More progressed than regressed. Most who progressed moved to preparation. Most individuals who adopted physical activity indicated being in preparation prior to adopting activity with equal numbers moving to action and maintenance from this stage. The majority of those in preparation, however, stayed in preparation. Most maintainers and those in action stayed active. Most who relapsed from preparation relapsed to contemplation. Most who relapsed from maintenance, relapsed to preparation.

The subjects in this study were then categorized into four stage movement patterns based upon their stage movement from phase 1 to phase 2 and from phase 2 to phase 3 in order to utilize longitudinal data to conduct further analyses regarding the processes of change, self-efficacy and decision making. The four groups include: (1) Stable Actives -

individuals who remained in either maintenance or action at both data collection points: (2) Stable Inactives - individuals who remained in precontemplation, contemplation, or preparation: (3) Progressors - individuals who moved up in stage classification: and (3) Regressors - individuals who moved back in stage classification. The stage movement break-down for each group and the frequency of occurrence of each pattern is reported in Table 2-14.

Table 2-14
Stage Pattern Groups
Frequencies and Percentages

Stage Pattern Group	Phase 1- Phase 2	Phase 2 – Phase 3
Stable Actives	30 (25.6%)	20 (30.8%)
Maintenance-Maintenance	28	17
Action-Action	2	3
Stable Inactives	42 (35.9%)	20 (30.8%)
Preparation-Preparation	32	14
Contemplation-Contemplation	4	3
Precontemplation-Precontemplation	6	3
Progressors	21 (22.2%)	16 (24.6%)
Precontemplation-Contemplation	2	1
Precontemplation-Preparation	3	1
Contemplation-Preparation	6	5
Contemplation-Action	2	-
Contemplation-Maintenance	-	-
Preparation-Action	5	4
Preparation-Maintenance	5	4
Action-Maintenance	3	1
Regressors	19 (16.2%)	9 (13.8%)
Contemplation-Precontemplation	2	1
Preparation-Precontemplation	2	1
Preparation-Contemplation	9	2
Action-Contemplation	1	-
Action - Preparation	-	1
Maintenance-Contemplation	1	-
Maintenance-Preparation	4	3
Maintenance – Action	-	1

Comparisons were then made between these stage pattern groups on all demographic variables. Chi Square analyses revealed that individuals in the four stage pattern groups did not differ significantly on any of the occupational category variables or gender at either the Phase 1-Phase 2 transition or the Phase 2-Phase 3 transition. As well, analysis of variance indicated that there were no significant age differences between the stage pattern groups (Appendix T).

Differences between study participants and study drop-outs were examined based upon stage of change pattern from phase one to phase two (Table 2-15). Although more stable actives continued with the study than dropped-out, chi square analysis revealed significant differences did not exist in the proportion of individuals who continued with the study and those that dropped out from the study based upon stage of change patterns from phase one to phase two ($\chi^2=.087$, $p=.993$).

Table 2-15
Comparison Between Study Participants and Study Drop-outs Based Upon Phase One-Phase Two Stage Patterns
Frequencies and Percentages

<i>Stage of Change Pattern</i>	<i>Phase 3</i>	<i>Phase 3</i>	<i>Total</i>
<i>Phase 1-Phase 2</i>	<i>Participant</i>	<i>Drop-Out</i>	
Stable Actives	19 (63%)	11 (37%)	30
Maintenance - Maintenance	17	11	28
Action - Action	2	0	2
Stable Inactives	22 (52%)	20 (48%)	42
Precontemplation - Precontemplation	5	1	6
Contemplation - Contemplation	2	2	4
Preparation-Preparation	15	17	32
Progressors	13 (50%)	13 (50%)	26
Precontemplation - Contemplation	0	2	2
Precontemplation - Preparation	0	3	3
Contemplation - Preparation	5	1	6
Contemplation - Action	1	1	2
Preparation - Action	2	3	5
Preparation - Maintenance	4	1	5
Action - Maintenance	1	2	3
Regressors	10 (53%)	9 (47%)	19
Contemplation - Precontemplation	0	2	2
Preparation - Precontemplation	0	2	2
Preparation - Contemplation	5	4	9
Action - Contemplation	1	0	1
Maintenance - Contemplation	1	0	1
Maintenance - Preparation	3	1	4
<i>Total</i>	<i>64</i>	<i>53</i>	<i>117</i>

A similar percentage of progressors, regressors and stable preparers dropped-out of the study as those that continued. More stable actives and stable inactives continued with the study than dropped-out. The highest drop-out rates were found in the stable preparer (53%) and progressor (50%) groups.

In order to examine the relationship between stage of change and the other variables in this study, namely processes of change, self-efficacy and decision balance, both cross-sectional and longitudinal stage groupings and analyses were employed.

2.5.3 Cross-Sectional Analysis

The relationships between stage of change and processes of change, self-efficacy and decision balance were first examined cross-sectionally at each phase of the overall study. Individuals were categorized into three stage of change groupings, inactives, preparers and actives, at each phase in order to conduct cross-sectional analyses due to low sample sizes in stage of change categories at phase 2 and phase 3. Multivariate analysis of variance with follow-up univariate analysis of variance for each dependent variable was utilized in order to examine the use of the processes of change by stage of change at each phase in this study. In addition, at phase three, self-efficacy and decision-making were assessed. The multivariate analysis of variance at phase three included self-efficacy and decision making measures. The Wilks' Lambda omnibus multivariate test was significant for each phase: Phase one ($F_{(2,399)}=19.701, p<.05$), phase two ($F_{(2,121)}=7.367, p<.05$), phase three ($F_{(2,65)}=2.934, p<.05$). The results for the follow-up univariate analysis of variance tests for each process of change, including post-hoc Scheffe tests, are provided in the following sections.

2.5.3.1 Processes of Change

The results of the cross-sectional follow-up univariate analyses of variance indicating the frequency of use of each process of change for each stage are presented in Table 2-16 for Phase One, Table 2-17 for Phase Two and Table 2-18 for Phase Three.

Table 2-16
Means, Standard Deviations, ANOVA and Post-Hoc Comparison Results for
Processes of Change by Stage of Change at Phase One

<i>Process</i>	<i>Stage of Change</i>			F (2,399)	p
	Inactive (n=80)	Preparation (n=190)	Active (n=30)		
Consciousness Raising	2.14 ^a (0.83)	2.59 ^b (0.85)	2.99 ^c (1.01)	22.25	<.001
Dramatic Relief	1.95 ^a (0.95)	2.09 ^a (0.79)	2.07 ^a (0.96)	0.68	0.505
Environmental Reevaluation	2.30 ^a (1.02)	2.54 ^a (0.92)	2.48 ^a (0.95)	1.78	0.169
Self Reevaluation	2.60 ^a (1.21)	3.03 ^b (0.97)	3.29 ^c (1.12)	10.18	<.001
Social Liberation	2.56 ^a (0.78)	2.72 ^{ac} (0.78)	2.86 ^{bc} (0.89)	3.27	0.039
Counterconditioning	1.88 ^a (0.64)	2.73 ^b (0.73)	3.77 ^c (0.77)	174.10	<.001
Helping Relationships	1.66 ^a (0.75)	2.02 ^b (0.90)	2.26 ^c (1.01)	10.57	<.001
Reinforcement Management	1.98 ^a (0.88)	2.67 ^b (0.78)	3.10 ^c (0.92)	42.70	<.001
Self Liberation	2.54 ^a (0.81)	3.25 ^b (0.78)	3.87 ^c (0.75)	72.83	<.001
Stimulus Control	1.59 ^a (0.61)	1.96 ^b (0.70)	2.07 ^c (0.74)	12.39	<.001

Similar superscripts denote stages that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests, in frequency of use of the process of change. Different superscripts denote stages that are significantly different.

Table 2-17
Means, Standard Deviations, ANOVA and Post-Hoc Comparison Results for
Processes of Change by Stage of Change at Phase Two

<i>Process</i>	<i>Stage of Change</i>			F(2,121)	p
	Inactive (n=30)	Preparation (n=46)	Active (n=46)		
Consciousness Raising	2.19 ^a (0.77)	2.56 ^a (0.72)	2.63 ^a (0.95)	2.77	0.067
Dramatic Relief	2.20 ^a (0.76)	2.24 ^a (0.89)	1.96 ^a (0.86)	1.39	0.252
Environmental Reevaluation	2.36 ^a (1.04)	2.54 ^a (0.89)	2.42 ^a (0.85)	0.39	0.679
Self Reevaluation	2.49 ^a (1.00)	2.89 ^a (0.98)	3.05 ^a (1.02)	2.94	0.057
Social Liberation	2.43 ^a (0.83)	2.82 ^a (0.69)	2.65 ^a (0.72)	2.42	0.093
Counterconditioning	1.87 ^a (0.56)	2.46 ^b (0.59)	3.19 ^c (0.66)	43.44	<.001
Helping Relationships	1.59 ^a (0.72)	1.98 ^{ac} (0.79)	2.23 ^{bc} (0.91)	5.55	0.005
Reinforcement Management	2.08 ^a (0.88)	2.72 ^b (0.75)	2.84 ^c (0.96)	7.56	0.001
Self Liberation	2.59 ^a (0.76)	3.24 ^b (0.64)	3.61 ^c (0.69)	19.63	<.001
Stimulus Control	1.64 ^a (0.65)	2.01 ^{ac} (0.64)	2.20 ^{bc} (0.74)	3.42	0.036

Similar superscripts denote stages that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests, in frequency of use of the process of change. Different superscripts denote stages that are significantly different.

Table 2-18
Means, Standard Deviations, ANOVA Results, Post-Hoc Comparison Results for
Processes of Change by Stage of Change at Phase Three

<i>Process</i>	<i>Stage of Change</i>			<i>F</i> (2,65)	<i>p</i>
	Inactive (n=10)	Preparation (n=23)	Active (n=30)		
Consciousness Raising	2.15 ^a (1.15)	2.26 ^a (0.88)	2.69 ^a (0.89)	2.00	0.172
Dramatic Relief	2.85 ^a (1.17)	1.91 ^a (0.78)	2.05 ^a (0.74)	4.63	0.050
Environmental Reevaluation	2.45 ^a (1.25)	2.46 ^a (0.81)	2.42 ^a (0.87)	0.02	0.869
Self Reevaluation	2.75 ^a (1.26)	2.96 ^a (0.82)	3.30 ^a (0.82)	1.81	0.185
Social Liberation	2.58 ^a (0.77)	2.76 ^a (0.88)	2.76 ^a (0.87)	0.19	0.615
Counterconditioning	1.85 ^a (0.75)	2.61 ^b (0.69)	3.57 ^c (0.75)	25.02	<.001
Helping Relationships	1.47 ^a (0.75)	1.80 ^{ab} (0.76)	2.20 ^b (0.89)	3.39	0.049
Reinforcement Management	2.02 ^a (0.92)	2.67 ^{ac} (0.82)	2.77 ^{bc} (0.67)	3.65	0.029
Self Liberation	2.90 ^a (0.94)	3.22 ^{ac} (0.78)	3.67 ^{bc} (0.69)	4.61	0.009
Stimulus Control	1.50 ^a (0.48)	1.86 ^{ac} (0.66)	2.06 ^{bc} (0.64)	3.08	0.032

Similar superscripts denote stages that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests, in frequency of use of the process of change. Different superscripts denote stages that are significantly different.

Use of the processes of change were found to differ significantly between the three stages of change at all three phases of this study. However, differences were found in the number of processes used differentially by individuals at various stages of change. Differences were found in the use of eight processes at phase one, five processes at phase two and six processes at phase three. Consistent with the Transtheoretical Model, use of most of these processes generally increased from the inactive group to the active group. Across all three phases, significant differences in the use of the behavioral processes were found between stage of change groups indicating that behavioral processes increase more across the stages than do the experiential processes. These processes were counterconditioning, helping relationships, reinforcement management, stimulus control and self liberation. In general, the active group used these processes more than preparers who used these processes more than the inactive group.

2.5.3.2 Self-Efficacy and Decision Making

The results for the follow-up one-way analysis of variance for the relationship between self-efficacy and decision making and stage of change at phase three are presented in Table 2-19. The results of this analysis revealed that expected differences were observed in these variables between the stages. Self-efficacy levels and the pros of exercise were higher for active individuals than preparers, and higher for preparers than inactive individuals. The cons of exercise were higher for inactive individuals than preparers, and higher for preparers than active individuals. These differences were only statistically significant for the cons of exercise, but the expected trend existed for the pros of exercise as well. The decision balance (pros-cons) was positive for all stages, with the differences increasing between the stages, indicating that the pros are rated higher than the cons of exercise prior to individuals entering the preparation stage and this difference increased as individuals become more active.

Table 2-19
Self-Efficacy and Decision Making
Means, Standard Deviations, ANOVA and Post-Hoc Comparison Results
by Stage of Change

	<i>Stage of Change</i>			F _(2,65)	p
	Inactive	Preparation	Active		
Self-Efficacy	14.00 ^a (6.15)	17.56 ^a (5.82)	24.70 ^b (4.81)	19.58	<0.001
Cons	2.78 ^a (0.68)	2.51 ^{ac} (0.65)	2.06 ^{bc} (0.76)	4.83	0.011
Pros	3.19 ^a (1.30)	3.37 ^a (0.97)	3.83 ^a (0.79)	2.41	0.098
Decision Balance (Pro-Con)	0.41 ^a (1.33)	0.86 ^a (1.27)	1.76 ^b (1.18)	6.03	0.004

Similar superscripts denote stages that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests. Different superscripts denote stages that are significantly different.

2.5.4 Longitudinal Analyses

The relationship between stage of change pattern and processes of change, self-efficacy and decision balance was subsequently examined using longitudinal stage of change data. Individuals were categorized into four stage of change patterns, stable inactives, stable actives, progressors and regressors for each stage transition period. As stage of change and processes of change were assessed at all three phases, a one-way repeated measures multivariate analysis of variance was performed to assess the relationship between the stage pattern groups and use of the processes of change over time to determine if any significant differences existed in process use over time between the groups. In addition, multivariate analysis of variance with follow-up univariate analysis of variance for each dependent variable was utilized in order to examine the relationship between stage pattern groups and self-efficacy and decision-making. The

Wilks' Lambda omnibus multivariate test was significant (Wilks Lambda=.544, $p<.001$) indicating a significant difference between groups on at least one of the variables. Follow-up univariate analysis of variance indicated the existence of significant differences between groups for self-efficacy, the cons of exercise and decision balance (Table 2-22).

Results of the one-way repeated measures multivariate analysis of variance indicated significant differences for Phase 1-Phase 2 transition (Wilks' Lambda = .794, $p=.006$) and for the Phase 2-Phase 3 transition (Wilks' Lambda =.653, $p=.008$) indicating that use of the processes of change did differ significantly over time across all groups. Follow-up one-way repeated measures multivariate analysis of variance was performed for each group separately to examine differential changes in use of the processes of change for each stage pattern group. The results of this analysis revealed that the overall MANOVA for the stable inactives, progressors and regressors was not significant at either the phase 1-phase 2 transition or the phase 2-phase 3 transition indicating that use of the processes of change did not differ significantly over time for any of these groups. Examination of the trends in the data (Appendix U) indicated that, although these differences were not statistically significant, process use for most of the processes was found to increase for individuals that exhibited stage progression, and decreased for individuals that exhibited stage regression. Trends in the data were inconsistent for individuals that remained inactive in that for the Phase 1- Phase 2 transition, use of most of the processes decreased, while for the Phase 2 – Phase 3 transition, use of most of the processes increased. The results of the overall MANOVA for the stable active groups, however, was significant at both the phase 1-phase 2 transition (Wilks' Lambda= .523, $p<.001$) and the phase 2 – phase 3 transition (Wilks' Lambda=.137, $p=.004$). Results of the follow-up univariate analysis for both stable active groups are reported in Table 2-20 for the phase 1-phase 2 transition and in Table 2-21 for the phase 2-phase 3 transition.

Table 2-20
Change in Process Use for Stable Active Stage Pattern Group
Phase 1 – Phase 2
Means and Standard Deviations

Process	Phase 1 – Phase 2		$F_{(1,29)}$	p
<i>Experiential Processes</i>				
Consciousness Raising	2.75 ^a (0.99)	2.80 ^a (1.06)	.101	.753
Dramatic Relief	1.93 ^a (0.93)	1.98 ^a (0.91)	.170	.683
Environmental Reevaluation	2.26 ^a (0.96)	2.34 ^a (0.90)	.630	.434
Social Liberation	2.59 ^a (0.87)	2.58 ^a (0.71)	.004	.951
Self Reevaluation	3.11 ^a (1.05)	3.08 ^a (1.03)	.067	.798
<i>Behavioral Processes</i>				
Counterconditioning	3.78 ^a (0.75)	3.15 ^b (0.65)	26.404	<.001
Helping Relationships	2.08 ^a (0.93)	2.27 ^a (0.86)	2.191	.150
Reinforcement Management	2.99 ^a (0.88)	2.75 ^b (0.88)	4.515	.042
Stimulus Control	1.96 ^a (0.56)	2.00 ^a (0.76)	.090	.766
Self Liberation	3.85 ^a (0.79)	3.59 ^b (0.70)	5.434	.027

Different superscripts denote significant ($p < .05$) change in process use from baseline to follow-up. Similar superscripts denote no significant changes in process use from baseline to follow-up.

Table 2-21
Change in Process Use for Stable Active Stage Pattern Group
Phase 2 – Phase 3
Means and Standard Deviations

Process	Phase 2 – Phase 3		$F_{(1,19)}$	p
<i>Experiential Processes</i>				
Consciousness Raising	2.67 ^a (0.93)	2.63 ^a (0.87)	.102	.753
Dramatic Relief	1.90 ^a (0.77)	1.90 ^a (0.72)	.000	1.000
Environmental Reevaluation	2.37 ^a (0.90)	2.42 ^a (0.88)	.121	.731
Social Liberation	2.43 ^a (0.63)	2.56 ^a (0.87)	.583	.455
Self Reevaluation	3.08 ^a (0.90)	3.26 ^a (0.86)	1.787	.197
<i>Behavioral Processes</i>				
Counterconditioning	3.16 ^a (0.52)	3.66 ^b (0.55)	22.353	<.001
Helping Relationships	2.05 ^a (0.75)	2.10 ^a (0.82)	.059	.811
Reinforcement Management	2.81 ^a (0.83)	2.66 ^a (0.76)	1.413	.249
Stimulus Control	1.97 ^a (0.77)	2.08 ^a (0.69)	.928	.348
Self Liberation	3.71 ^a (0.65)	3.62 ^a (0.69)	.503	.407

Different superscripts denote significant ($p < .05$) change in process use from baseline to follow-up. Similar superscripts denote no significant changes in process use from baseline to follow-up.

From phase one to phase two, use of three processes, namely counterconditioning, reinforcement management and self liberation were found to decrease over time for the stable active group. From phase two to phase three, use of only one of these processes, counterconditioning, was found to change over time for this group and use of this process was found to increase.

In examining the relationship between longitudinal stage patterns and self-efficacy and decision making variables (Table 2-22), it was found that as predicted, self-efficacy and decision-balance scores were rated higher by stable actives than stable inactives. As well, the cons of exercising were rated lower by stable actives than stable inactives. A trend also existed in which the pros of exercising were rated higher by stable actives than stable inactives, however, this difference was not found to be statistically significant. These results essentially reflect the results of the analysis utilizing cross-sectional stage of change groupings. Examination of the results for progressors and regressors revealed that these individuals represent a cross-section of stage progression and regression. The progressors generally moved into stages of some or regular activity (preparation, action and maintenance) while the regressors generally relapsed into stages of no activity (contemplation or precontemplation). As expected, the self-efficacy levels were significantly higher for the progressors than the stable inactives. In addition, the expected trend was evident with progressors and regressors indicating lower self-efficacy than stable actives, but progressors displaying higher self-efficacy than regressors.

In terms of the decision making variables, the expected trend was found for the pros of exercise, with the pros increasing from stable inactives to regressors to progressors to stable actives, although these differences were not statistically significant. The findings for the cons of exercise, and as a result the decision balance measures, was not completely as expected. All groups rated the cons of exercise higher and displayed smaller decision balance measures than the stable active group which was anticipated. These differences were statistically significant for the stable inactive and progressor groups for both the cons of exercise and the decision balance measures. The trend of the results was not as expected for the progressors who rated the cons of exercise higher than both the stable inactive and regressor groups and displayed a smaller decision balance score than the regressor group, however, these findings were not statistically significant.

Table 2-22
Self-Efficacy and Decision Making
Means, Standard Deviations, ANOVA and Post-Hoc Comparison Results by
Stage Group Pattern (Phase 2-Phase3)

Variable	Stable Actives (n=20)	Stable Inactives (n=20)	Progressors (n=16)	Regressors (n=9)	F _(3,64)	p
Self-Efficacy	25.1 ^a (4.49)	15.75 ^b (6.43)	21.81 ^{ac} (5.30)	17.22 ^{bc} (6.70)	10.374	<.001
Cons	1.87 ^a (0.67)	2.60 ^b (0.73)	2.66 ^b (0.77)	2.25 ^{ab} (0.46)	5.110	.003
Pros	3.92 ^a (0.67)	3.32 ^a (1.20)	3.45 ^a (0.96)	3.36 ^a (1.03)	1.398	.253
Decision Balance (Pros-Cons)	2.03 ^a (0.99)	0.73 ^b (1.42)	0.78 ^b (1.32)	1.00 ^{ab} (1.17)	4.497	.007

Similar superscripts denote stages groups that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests. Different superscripts denote stage groups that are significantly different.

2.6 Discussion

The aim of this study was to examine the application of the Transtheoretical Model to exercise utilizing both cross-sectional and longitudinal data analysis. The results provide some support for the structure of the Transtheoretical Model as applied to exercise. Stage of change patterns over time generally support the Transtheoretical Model, although the results suggest that some discrepancies found in the present study with stage pattern movements proposed by the Transtheoretical Model may partially be explained by the way the preparation stage was measured in the current study. In terms of the processes of change, some support for the Transtheoretical Model was found in this study. Findings for self-efficacy and decision making variables were generally consistent with previous research.

2.6.1 Stages of Change

Results of both cross-sectional and longitudinal data analysis generally provide support for the stages of change for exercise, however, some differences from what would be expected were noted. Most individuals at each phase of data collection were able to be classified into an exercise stage of change based upon the modified version of the stage of change measure (Marcus, Eaton, Rossi & Harlow, 1994) utilized in this study. Stage of change patterns over time were of particular interest. As suggested by the Transtheoretical Model, stage of change patterns displayed both stability and change. Half of the subjects in this study remained in the same stage of change over the twelve-month period while the other half either progressed, regressed or displayed a variable stage movement pathway of progression then regression or regression then progression. This is similar to results reported by Marcus, Simkin, Rossi and Pinto (1996) of stage pattern movement over a six-month interval. They reported that just over half of the subjects in their study displayed a stable stage movement pattern (59%), whereas just under half of the subjects displayed the adoption of activity or relapse from activity (41%).

Contrary to what would be expected, the results of this study found that very few individuals remained in contemplation over an extended period of time, with no individuals remaining in that stage of change over the entire twelve-month interval. According to the Transtheoretical Model, it is not unusual for individuals to spend extended periods of time (e.g. years) wanting to change but not being sure how to get there. They tend to get stuck in the contemplation stage for extended periods of time. The results of this study, however, indicate that for exercise, many more individuals remain in preparation for an extended period of time rather than contemplation which is not what the Transtheoretical Model would suggest. Individuals are expected to move through preparation into action in a very short period of time (next 30 days) as they have made the commitment to change and are in the process of adopting the behavior. These findings suggest that for exercise, individuals tend to move out of the contemplation stage

more quickly (between six and twelve months). Perhaps the availability of opportunities to integrate physical activity into one's daily life through the availability of a corporate fitness program allowed those individuals to try some physical activity and to move out of the contemplation stage. This inconsistency with what is proposed by the Transtheoretical Model may also be due to the way in which the preparation stage is assessed on the stage of change measure utilized in this study. The stage of change measure used in this study (Marcus, Eaton et al., 1994; Cardinal, 1995, 1997) measured the preparation stage with the statement, "I exercise some but not regularly". This statement may not capture the essence of those in preparation who have committed themselves to taking action and are taking some steps to become active. In preparing to take action, individuals may be doing more than being active on an irregular basis. Individuals who are preparing to take action for exercise may be looking for courses to take, shopping for clothes to wear while exercising, finding someone to participate with and a variety of other preparatory actions. Individuals who are classified in this stage using this measure may be participating irregularly in exercise and may be content with that level of participation and do not intend to become more active (the stable preparers) as well as those that are intending to become more active and are making plans to do so in the immediate future. This is supported by the results of this study in that similar numbers of individuals remained in preparation during the course of this study as those that moved out of the stage. The preparation stage may be more accurately measured by a statement that includes a measure of one's intentions toward increasing their activity levels and by including various preparatory behaviors undertaken. The suggestion to combine both intention and behavior has been made by previous researchers (Godin et al., 1995). The latter may include such things as looking for opportunities to be active, purchasing the appropriate clothing, and seeking an exercise companion.

Further support for the stage of change construct was found in examining stage movement over time. Stage pattern movements displaying progression were generally as expected. Those in contemplation were more likely to become active than those in precontemplation, most contemplators who progressed moved into the action stage, and most individuals who adopted exercise indicated being in preparation prior to adopting

activity. The Transtheoretical Model proposes that most individuals who relapse often continue to desire to participate in the target behavior and thus return to the contemplation stage rather than the precontemplation stage. This was partially supported by this study. Individuals who relapsed from preparation were found to return to the contemplation stage. Individuals who relapsed from maintenance, however, were found to return to the preparation stage. This suggests that for exercise, individuals who are regularly active, when they relapse, do not give up all exercise altogether, but rather participate in exercise less frequently. This also suggests that for those individuals who do relapse from being active, they still desire to be active.

2.6.2 Processes of Change

Previous research investigating the applicability of the Transtheoretical Model to exercise has reported differences in terms of which processes of change are used in the exercise behavior change process. Marcus, Rossi and colleagues (1992) indicated that individuals utilized all ten processes of change, whereas Gorely and Gordon (1995) reported that only five processes of change (self reevaluation, consciousness raising, counterconditioning, self liberation and stimulus control) are involved in movement across the stages of change.

In the current research, three replication studies were conducted investigating the differential use of the processes of change by individuals at different stages of change. It was found that use of all ten processes of change tended to increase from those who were inactive to preparers to those who were active, but use of all ten processes of change was not statistically significantly different by individuals at different stages of the behavior change process. Use of eight processes (consciousness raising, self reevaluation, social liberation, counterconditioning, helping relationships, reinforcement management, self liberation and stimulus control) differed significantly in the first study, use of five processes (counterconditioning, helping relationships, reinforcement management, stimulus control and self liberation) differed significantly in the second study, and use of six processes (counterconditioning, helping relationships, reinforcement management, self liberation and stimulus control) differed significantly in the third study. A consistent

finding across the three replication studies was that all behavioral processes of change were found to be used at different levels by individuals at different stages of change. Counterconditioning and stimulus control was found to be used more by preparers than inactives, and more by actives than preparers across the three studies. In all three studies, use of reinforcement management and self-liberation was greater for preparers and actives than inactives. Use of helping relationships was found to be greater for actives than inactives in all three studies. This suggests that for individuals to become active, it is particularly important for them to receive positive social support through encouragement to exercise, to value the benefits of exercise and to be reinforced for participating either externally (recognition, achieving goals) or internally (experience the benefits of participation), to set up prompts and reminders to exercise, and to take responsibility to exercise and to make a commitment to exercise.

These results provide support to some findings from previous research. Similar to Gorely and Gordon (1995), this research found that counterconditioning, and self liberation are change processes used differently by individuals at different stages of change. However, this study also identified helping relationships and reinforcement management as being important, contrary to Gorely and Gordon's (1995) findings. The findings of this research are consistent with those of Marcus, Rossi and colleagues (1992) in that the process of change use tended to increase from the inactive stages to the more active stages. However, all ten processes of change were not found to be used differentially by individuals representing different stages of change. Across the three studies, only four of the ten processes of change were consistently found to be used differentially across the stages of change. The lack of statistical significance in this study, however, may be partially due to the different stage of change categories utilized in this study. This study used three groups (inactives, preparers, actives) rather than the five stages of change utilized in previous research (Gorely & Gordon, 1995, Marcus, Rossi et al, 1992). Previous research has found significant differences in process use between precontemplation and contemplation which was not examined in this study due to collapsing inactive groups together as a result of small sample sizes and the desire to make comparisons across the three data collection phases. Collapsing the categories may

have had the greatest impact upon finding statistical significance for the experiential processes of change. Marcus, Rossi and colleagues (1992) reported that dramatic relief, environmental reevaluation and self-reevaluation increased from preparation to action and decreased from action to maintenance. If these differences were to have existed in this study, the attainment of statistical significance may have been influenced through collapsing the action and maintenance stages into the same group. Marcus and colleagues (1992) also reported the increased use of behavioral processes from contemplation to preparation to action. This finding was replicated in this study for four of the five behavioral processes.

One of the proposed strengths of the Transtheoretical Model is that it reflects the temporal dimension of the change process by identifying stages in the process of behavior change. Most of the research examining the Transtheoretical Model has been cross-sectional in nature utilizing the stages of change as reflecting the dynamic nature of the change process. One of the strengths of the longitudinal, repeated-measures design of the present study was to examine changes over time. In categorizing individuals with respect to their stage of change patterns over time (e.g. stable actives, stable inactives, progressors, regressors), the present study was able to examine the longitudinal nature of the relationship between the processes of change and behavior change patterns over time. Longitudinal designs are important to test the applicability of the Transtheoretical Model to exercise as they are able to assess how process variables operate as individuals progress, regress or remain stable through the behavior change process. The Transtheoretical Model suggests that changes in process use lead to changes in intentions and behavior. Although cross-sectional designs may demonstrate differences in process use between stage of change categories, they are not able to determine whether changes in process use are associated with movement through the stages of change.

In examining process of change use over time, the findings of this study provided some support the Transtheoretical Model. According to the Transtheoretical Model, use in the processes of change increase as individuals progress through the stages of change, decrease when individuals regress, and remain stable when no behavior change occurs. Trends were found in the data indicating that individuals that progressed stages increased

their process use while individuals that regressed stages decreased their process use. The statistical analysis may have been influenced by small sample sizes, however, as these findings were not found to be statistically significant. Some support was found with individuals that did not display movement through the stages of change in that no statistically significant changes were also found in use of the processes of change for the stable inactives which does support the Transtheoretical Model. As well, no changes were found in use of most of the processes of change for the stable actives. However, contrary to what is proposed by the Transtheoretical Model, individuals displaying a stable active stage pattern movement over time did indicate changes in process use, with use of counterconditioning, reinforcement management and self liberation decreasing at the first transition, and with counterconditioning increasing at the second transition. The processes that were found to change for the stable active individuals were behavioral processes. Cross-sectional research investigating use of the processes of change across the stages of change for exercise has demonstrated that use of the behavioral processes tends to increase from non-active stages (e.g. precontemplation, contemplation and preparation) to maintenance and with no differences being found in use between the action and maintenance stages. This suggests that for exercise, active individuals continue to use the behavioral processes to maintain their behavior changes. For those that are already active, increased use of counterconditioning found in the present study at the phase two to phase three transition could indicate a continued reliance on these processes to maintain the behavioral changes. However, this is not supported in the stage one to stage two transition in this study as use of three behavioral processes of change, namely counterconditioning, reinforcement management and self liberation, was found to decrease rather than increase. According to the Transtheoretical Model, stable groups should be maintaining their process use over time, whereas individuals that regress should decrease their process use, while individuals that progress should increase their process use. This study demonstrated inconsistent changes in process use for those displaying a stable active stage movement pattern which is not in accordance with what is expected according to the Transtheoretical Model.

The findings of the present study that demonstrate a lack of support for the use of the processes of change in leading to movement through the stages of change are contrary to those reported by Marcus and colleagues (Marcus, Simkin, Rossi & Pinto, 1996) who reported that process use increased for exercise adopters, decreased for exercise relapsers and remained stable for individuals who did not display behavior changes. The study conducted by Marcus and colleagues (1996) utilized a sample that consisted of employees of two worksites, a retail outlet and an industrial manufacturer, that were similar demographically to the sample in the present study in which the majority of subjects were female (66%) and an average age of the employees of 41 years.

Similar to the present study, Marcus and colleagues (1996) grouped subjects into four stage of change pattern categories. However, Marcus and colleagues categorized their stage of change patterns slightly differently than the present study. First, the stable active group in the study conducted by Marcus and colleagues (1996) was comprised of individuals who remained in maintenance, action and preparation stages while the stable inactive group was comprised of individuals who remained in precontemplation and contemplation. The categorization utilized in the present study was similar except that those that remained in the preparation stage were categorized as stable inactives as according to the definition of the adoption of exercise utilized in the present study, those in preparation were not considered as regular exercisers. This difference in categorization is not expected to influence the differences in results obtained between the two studies as process use is expected to remain stable for all stable stage pattern groups.

The categorization of stage of change patterns also differed between the two studies for those individuals displaying changes in stage movement over time. In examining changes in process use for those who displayed stage progression, Marcus and colleagues (1996) examined only those individuals who displayed a stage pattern consistent with traditional definitions of the adoption of exercise and included only those individuals who crossed the "action boundary" from inactive stages to active stages in which preparation was considered an active stage (e.g. precontemplation to preparation, precontemplation to action, precontemplation to preparation, contemplation to action, contemplation to maintenance). As well, Marcus and colleagues (1996) examined only

those individuals who displayed a stage pattern consistent with traditional definitions of a relapse from exercise and included only those individuals who moved from active stages back to inactive stages (e.g. preparation to precontemplation, preparation to contemplation, action to precontemplation, action to contemplation, maintenance to precontemplation, maintenance to contemplation) in examining regression through the stages.

In the present study, stage movement was not limited to the traditional definition of the adoption of or relapse from exercise, but rather any movement forward through a stage of change was considered a progression and any movement backward was considered a regression. Again, these differences in categorizations was not expected to influence the differences in results obtained between the two studies as process use is expected to increase for any type of progression through the stages and decrease for any type of regression.

The inconsistent findings between the present study and the study conducted by Marcus and colleagues (1996) may indicate that the Transtheoretical Model is not applicable to exercise for the sample in the present study, or may be due to differences in sample sizes between the two studies. The stage pattern groups used by Marcus and colleagues consisted of 63 exercise adopters, 37 exercise relapsers, 78 stable sedentary individuals and 67 stable active individuals. The smaller sample sizes utilized in the present study may have led to decreases in statistical power as compared to the study conducted by Marcus and colleagues (1996). However, the lack of statistical significance resulting from these smaller sample sizes may be due to the effects of individual variation. It has been suggested that the aggregate nature of the data used by ANOVA techniques does not adequately reflect theoretical models that refer to processes associated with individuals rather than aggregates of observations gathered from groups of individuals (Bouffard, 1993). More longitudinal research that incorporates designs that emphasize the importance of individual patterns of behavior change, such as single subject designs, are needed to examine the behavior change process at the individual level.

Research examining process use in the behavior change process for exercise is important to assess the potential contribution of the Transtheoretical Model to understanding and predicting exercise behavior. One aspect of the Transtheoretical Model that has been considered both a strength (Prochaska, 1979) and a weakness (Bandura, 1997) is identifying the ten processes of change that emanate from divergent theories. A potential major contribution of the model is to demonstrate evidence of use of these processes that bridge diverse theoretical approaches to behavior change. In demonstrating the use of all ten processes of change through the behavior change process for exercise, the Transtheoretical Model provides a challenge to the majority of current theories used to understand behavior change that focus on only a few of these processes within the particular theoretical framework. More research is required in the field of exercise psychology that examines the relationship between the variables identified by the Transtheoretical Model with theories and theoretical constructs utilized to explain exercise behavior.

Some studies to date have investigated the relationship between common theoretical models and theoretical constructs utilized to explain exercise behavior and the stages of change construct from the Transtheoretical Model. Gorely and Gordon (1995), Marcus and colleagues (Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992) and the present study have examined the relationship between self-efficacy and decision making variables and the stages of change and have demonstrated that these variables are related to stages of change in a theoretically consistent manner with self-efficacy and the pros of exercise generally being found to increase across the stages of change from precontemplation to maintenance, while the cons of exercise have been found to decrease across the stages of change from the precontemplation to the maintenance stages of change. Constructs from the Theory of Planned Behavior have also been examined in relation to the stages of change for exercise. Courneya (1995a) reported that each stage was discriminated from every other stage, except for action and maintenance, for Theory of Planned Behavior constructs including intention, attitude, subjective norm, perceived behavioral control, behavioral beliefs and control beliefs. Godin (1993) reported that attitude, belief-based dimension of

attitude and perceived behavioral control were lower for those that were inactive and had no intention to exercise than for those that are inactive and considering becoming active. Those that had adopted some exercise indicated lower levels of perceived behavioral control than those who were inactive but thinking about beginning activity. Perceived behavioral control was found to be higher for those who were exercising but wanted to exercise at least three times per week and those that continued to exercise regularly.

No studies to date have examined the relationship between theoretical constructs and the processes of change in relation to exercise behavior to examine the redundancy of predictors that may be labeled differently. Cross-sectional research investigating the relationship between the processes of change and the stages of change have indicated that most processes are used the least in the precontemplation stage as compared to the other stages of change (Gorely & Gordon, 1995; Marcus, Rossi, Selby, Niaura and Abrams, 1992). Inconsistencies have been reported in the processes used beyond the contemplation stage. In terms of the experiential processes, Marcus, Rossi, Selby, Niaura and Abrams (1992) reported differences between preparation, action and maintenance stages of change for three experiential processes, dramatic relief, environmental reevaluation and self-reevaluation. Gorely and Gordon (1995) reported that consciousness raising and self-reevaluation increased from preparation to maintenance. The present study found that use of consciousness raising, self-reevaluation, and social liberation increased across the stages of change at phase one only. In terms of the behavioral processes, Gorely and Gordon (1995) reported increased use of counterconditioning and self-liberation from contemplation to preparation to action, while the use of stimulus control increased from preparation to maintenance. Marcus and colleagues (Marcus, Rossi, Selby, Niaura & Abrams, 1992) reported that self-liberation, reinforcement management and counterconditioning were used significantly more in preparation than in contemplation and that all five behavioral processes increased between preparation and action. The present study found that use of four behavioral processes, counterconditioning, self-liberation, reinforcement management and helping relationships increased at later stages of change. Different studies have indicated support for use of different processes in the behavior change process for exercise. In terms of the

experiential processes, the one experiential process that has demonstrated consistent differential usage across the stages of change in the cross-sectional research conducted to date is self-reevaluation. More extensive support has been found for the behavioral processes, and in particular counterconditioning and self-liberation.

These findings suggest that constructs from more than one theoretical approach may be useful in understanding and predicting exercise behavior. The predictive utility of the Transtheoretical Model, however, needs to be examined in future research to further investigate whether use of the ten processes of change predict changes in behavior and to determine whether the processes of change provide additional explanation of the behavior change process beyond current theoretical approaches, or whether they influence behavior change through similar determinants identified through other theoretical models and constructs bearing different labels. For example, the process of self-reevaluation may involve changing one's beliefs, attitudes and self-efficacy which may in turn impact upon one's intentions and behaviors. Future research is needed to examine the relationship between the processes of change and other constructs from theoretical models used to explain exercise behavior to gain a more comprehensive understanding and explanation of the behavior change process.

2.6.3 Self-Efficacy and Decision Making

The self-efficacy and decision making results generally support previous research investigating the relationship between these variables and the stages of change (Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Selby et al., 1992). Self-efficacy was found to be greater for actives than inactives and preparers indicating that as people make progress toward becoming more active, they experience increasing levels of confidence to succeed. The cons of exercise were rated higher by inactives than preparers and those that were active, whereas the opposite trend was found with respect to the pros of exercise, although the trend for the pros of exercise was not found to be statistically significant.

In terms of the decision balance measure, active individuals reported a greater pro-con difference than inactive individuals and preparers suggesting that increasing the

perceived pros of exercise and decreasing the perceived cons of exercise is particularly important in order for individuals to adopt and maintain regular exercise. These findings are consistent with previous research investigating the relationship between the perceived pros and cons of exercise and stage of exercise behavior change. Previous research (Prochaska & Velicer, 1997; Prochaska, Velicer et al., 1994) has indicated that across a variety of behaviors including exercise, the cons of changing are lower in action than in contemplation suggesting that to progress from contemplation to action, the cons of changing must decrease. In addition, for the majority of behaviors, the crossover between the pros and cons of changing occur during the contemplation stage, however previous research on exercise has reported that the crossover occurred during the preparation stage (Marcus & Owen, 1992; Prochaska & Velicer, 1997; Prochaska, Velicer et al., 1994). This study suggests that for exercise, the crossover occurs prior to the preparation stage, but supports previous research indicating that assessing the pros of changing higher than the cons is a sign of being prepared for action.

This study also incorporated longitudinal stage movement patterns in examining self-efficacy and decision-making. The findings generally supported the Transtheoretical Model indicating differences in self-efficacy levels and the rated pros of exercise between the stable inactives, regressors, progressors and stable actives, although not all of these differences were found to be statistically significant. No significant differences were found between the stable inactives, progressors and regressors in their perceived cons and decision balance scores, however, the stable active group reported a significantly lower rating of the cons of exercise and a higher decision balance rating than the stable inactive and progressor groups.

2.6.4 Implications for Practice

There are several implications for practitioners resulting from the results of this study. Currently, a stage of change measure similar to the one utilized in this study is being used by physical activity practitioners (Canadian Society for Exercise Physiology, 1998). Results of this study indicate that further refinement of this questionnaire is desirable to assist practitioners in better assessment of the stages of change. Particular

attention needs to be paid to the preparation item. The present study found that individuals remained in preparation for extended periods of time. One reason for this is the way in which preparation was measured. The preparation item did not include a measure of intention therefore some individuals categorized in this stage in the present study may have been irregularly active and intending to do more activity, or may have been irregularly active and non intending to become more active. By definition, individuals in preparation are planning to become more active in the near future. Therefore this item needs to be refined for future use by practitioners to include a measure of intention and possibly other actions taken in the preparation for physical activity participation, to better reflect the definition of this stage of change.

As so many individuals were found to be in preparation and remain in preparation over extended periods of time, the results of this study indicate that there is a high need for physical activity practitioners to target this stage of change in promoting involvement in regular physical activity. This study found that individuals active on an irregular basis remained active on an irregular basis. Physical activity practitioners need to focus efforts on assisting individuals active on an irregular basis to become active on a regular basis.

The results of this study also found that those in the maintenance stage tended to remain in this stage over an extended period of time. This finding suggests that individuals who are active on a regular basis for an extended period of time are not at a high risk for relapse. Therefore, practitioners may need to focus less effort on relapse prevention strategies for those that are active over an extended period of time (e.g. more than six months).

In terms of strategies to assist individuals in the adoption and maintenance of physical activity, the strongest support in the present study was found for the behavioral processes of change, self-efficacy and decision making variables. Active individuals were found to use the behavioral processes more, have higher self-efficacy and a more positive decisional balance than those in preparation. Those in preparation were found to use the behavioral processes more, have higher self-efficacy and a more positive decisional balance than inactive individuals. This suggests that to assist individuals to become more active a number of strategies may be useful.

Enlisting the assistance of others, either by finding a friend or family member to be active with, asking friends or family members to encourage you to be active, or setting up buddy systems as part of physical activity settings, may be useful. The results of this study also suggest that physical activity may be facilitated by viewing and using physical activity as a way to relax, get more energy or spend time with friends and family, rather than other more sedentary activities undertaken for the same reasons. Physical activity participation may also be enhanced by using positive stimuli to remind individuals to exercise, such as leaving one's workout clothes at the door ready to be used, and by ensuring one is rewarded for positive behavioral changes. This may be accomplished through setting exercise goals, logging one's exercise behavior and implementing positive rewards as one reaches one's goals.

The results of this study also support the use of the decision balance sheet to assist individuals to consider the pros and cons of changing their behavior. This tool may assist practitioners to address the salient beliefs individuals have regarding the pros and cons of their behavior and to assist individuals in reassessing these beliefs toward making positive behavioral changes in their lives.

The results regarding self-efficacy in the present study suggests that enhancing self-efficacy to overcome barriers to involvement in physical activity may be important for those in precontemplation and contemplation. Barrier self-efficacy can be enhanced by assisting individuals to identify factors that they perceive as barriers to their involvement and then improving their self-efficacy to overcome these barriers. Barrier efficacy may be enhanced by assisting individuals to successfully negotiate their perceived constraints thereby providing them with mastery experiences in overcoming perceived barriers. Providing opportunities for individuals to learn through social modelling may also be useful.

2.6.5 Summary

In general, the findings of this study provide partial support for the application of the Transtheoretical Model to exercise. Results with respect to the stages of change, decision making and self-efficacy generally provide support for the model. Individuals

were found to progress, regress and maintain stable stage of change patterns over time as proposed by the Transtheoretical Model. Individuals in contemplation were more likely to become active than those in precontemplation, while most individuals who adopted exercise indicated being in preparation prior to moving into the action stage. This finding suggests that individuals progress through adjacent stages of change in becoming active. Findings with respect to self-efficacy and decision making variables were consistent with previous research providing further support that self-efficacy and the pros of exercise increase as one progresses across the stages of change, whereas the cons of exercise decrease as one progresses across the stages of change. In addition, the pros of exercise were rated higher than the cons of exercise prior to the adoption of exercise.

Aspects of the Transtheoretical Model, however, were not supported by this study. According to the Transtheoretical Model, individuals may become stuck in the contemplation stage for extended periods of time while an individual thinks about taking action. The present study found that for exercise, individuals tend to remain in preparation for extended periods of time. This finding may be due to the way in which the preparation stage of change was measured in this study in that no measure of activity intention was included in the item assessing the preparation stage. Therefore individuals who were irregularly active but had no intention of increasing activity were classified as preparers as well as individuals who were irregularly active who intended to become more active in the near future. It is suggested that future research include a more precise measure of the preparation stage of change that includes a measure of activity intentions as well as various preparatory actions for exercise in addition to making some initial attempts at being active.

Further research is also required on the processes of change in order to clarify discrepancies between the current study and previous research (Gorely & Gordon, 1995; Marcus, Rossi et al., 1992). In cross-sectional analyses, only four processes of change were consistently found to be used differentially between stage of change groups. In longitudinal analyses, contrary to the Transtheoretical Model, only the stable active groups reported changes in process use over time. More longitudinal research using different populations and larger sample sizes is required to clarify the discrepancies

between the present study and previous research in assessing the antecedents and consequences of exercise behavior change over time in order to provide further evidence of the generalizability of the model to exercise.

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CHAPTER 3

An Exploratory Investigation of Exercise Barriers and Facilitators Across the Stages of Change

3.1 Introduction

Due to the number of health-benefits associated with physical activity (Bouchard, Shephard & Stephens, 1994; Bouchard, Shephard, Stephens, Sutton & McPherson, 1990; Martinsen & Morgan, 1997; Raglin, 1997; Sonstroem, 1997), understanding physical activity involvement and the ways in which participation in this lifestyle behavior may be facilitated is an important concern for public health and health promotion. As a result, research has been undertaken in order to better understand this behavior. Researchers in the field of exercise psychology have attempted to identify the determinants or correlates of participation in physical activity to determine the factors associated with involvement and non-involvement in this behavior. A number of factors have been associated with physical activity involvement and have been generally categorized into three areas, namely personal attributes, characteristics of physical activity itself, and environmental variables.

In reviewing research investigating the determinants of physical activity, Dishman and Sallis (1994) indicated that consistent associations have been found between variables in each of the three general categories of determinants. They state that "these findings re-emphasize the importance of viewing physical activity as being influenced by many forces both inside and outside the person. The influences on physical activity cannot be understood unless characteristics of the person, the environment, and the activity itself are assessed" (p.225).

Research to date on the determinants of physical activity has been criticized for not taking into consideration the process of exercise acquisition and maintenance. Sallis and Hovell (1990) suggest that the determinants of participation are likely to be different for the various transition points in the process of physical activity involvement. They suggest that the determinants of adopting exercise are not necessarily the same as those involved in the maintenance of physical activity participation or in resuming involvement after dropping out. According to Dishman and Sallis (1994), determinants research to

date has "not adequately addressed the question of differences in determinants of adoption versus maintenance of physical activity" (p.222). Sallis and Hovell (1990) suggest that "contrasting the relative strengths of environmental, social, cognitive and physiological variables on the adoption, maintenance and resumption of exercise may provide information that will help in the design of appropriate interventions" (p.232). Therefore, research on the determinants of physical activity has been criticized as being static in nature in that involvement in physical activity is largely treated as a dichotomous, all-or-nothing variable. As a result, the dynamic, continuous process of behavior change has not been taken into consideration. One model that considers the dynamic nature of the change process and that has been adapted for use in studying physical activity participation is the Transtheoretical Model (Marcus, Selby, Niaura & Rossi, 1992; Marcus & Simkin, 1994; Prochaska & Marcus, 1994).

3.2 Exercise Determinants and Stage of Change

The Transtheoretical Model includes two core components in the behavior change process, the stages and processes of change. Prochaska and his colleagues (Prochaska & DiClemente, 1983) discovered that change unfolds through a series of stages. Five stages have been identified and defined according to the individuals' intentions and behaviors regarding the targeted area of behavior change. The five stages of change are defined for exercise as follows (adapted from DiClemente, Prochaska, Fairhurst, Velicer, Velasquez & Rossi, 1991):

Precontemplation: Not engaged in exercise or considering changing their sedentary lifestyle.

Contemplation: Not engaged in exercise, but seriously considering it within the next six months.

Preparation: Considering adopting regular exercise within the next month and have made some small behavioral changes already.

Action: Adopted regular exercise within past six months.

Maintenance: Adopted regular exercise and have maintained it for more than six months

The second component of the Transtheoretical Model is the processes of change. The processes of change have been defined as the "covert and overt activities that individuals use to modify problem behaviors " (Prochaska, Velicer, DiClemente & Fava, 1988, p.520). Prochaska and his colleagues identified ten cognitive-behavioral processes of change by reviewing the major systems of therapy and identified the common processes proposed across these theories to be utilized in the behavior change process. Use of these processes has been demonstrated in studies of both therapy-directed changers and self changers (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). Prochaska and his colleagues discovered that the "concept of stages was the key to relating all the various change processes from theoretically incompatible systems of psychotherapy in a coherent fashion" (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983; Prochaska, DiClemente, Velicer, Ginpil & Norcross, 1985, Prochaska, Norcross & DiClemente, 1994, p.38). Prochaska, Norcross & DiClemente (1994) state that "successful changers used these tools only at specific times, choosing a different one whenever the situation demanded a new approach. And these specific times were constant from one person to the next, regardless of what their problem was" (p.38). In testing the linkage between the stages and processes of change, Prochaska and his colleagues have found a systematic relationship among the stages and processes of change.

Two other constructs that have been consistently associated with stages of change are self-efficacy and decision making. Self-efficacy levels have been found to increase from precontemplation to maintenance. The perceived positive aspects of exercise have been found to increase from precontemplation to maintenance, the perceived negative aspects have been found to decrease from precontemplation to maintenance, and the point where the perceived benefits begin to outweigh the perceived costs occurs prior to the individual adopting exercise (Goreley & Gordon, 1995; Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Rakowski & Rossi, 1992).

Courneya (1995b) suggests that there is a need to study additional constructs beyond those already incorporated into the Transtheoretical Model to assist in developing

a model of exercise behavior change that identifies the most important variables for each stage transition. In the area of exercise psychology, researchers have begun to consider the stages of change in investigating the determinants of exercise behavior.

Several researchers have investigated the association of exercise determinants with stage of change. Although these studies used different measures to assess stage of readiness for physical activity involvement, measures of stage of change were shown to be associated in meaningful ways with a number of variables. These studies have indicated that differences exist between individuals representing various stages of change in some of the determinants of exercise including perceived severity of a health threat, beliefs, perceived benefits and barriers, subjective norm, attitude, perceived behavioral control, intention, exercise knowledge, physical self perceptions, and global self-esteem (Blalock et al., 1996; Booth et al., 1993; Courneya, 1995a, 1995b, 1997; Lee, 1993; Myers & Roth, 1997; Wyse, Mercer, Ashford, Buxton & Gleeson, 1995).

Lee (1993), Booth and colleagues (1993) and Myer and Roth (1997) examined the relationship between beliefs and knowledge and the stages of change. Lee (1993) reported that "exercise knowledge, perceived family support and perceived psychological benefits of exercise distinguished the action group from the precontemplators, whereas perceived barriers were the major difference between the contemplation and action groups" (p.479). Booth and colleagues (1993) reported that more strongly held beliefs about the benefit of exercise for preventing heart disease were associated with greater levels of physical activity. Myers and Roth (1997) examined the relationship between perceived benefits and barriers to exercise by assessing stage of change and perceived benefits and barriers through a scale that they derived as part of their study that measured social, psychological, body image and health benefits and time-effort, physical, social and other miscellaneous barriers. They reported that for time-effort barriers, those in precontemplation reported more than those in contemplation and those in contemplation reported more than those who were active. In addition, those in precontemplation and contemplation perceived more social barriers than those in maintenance. Those in precontemplation perceived fewer benefits than those in the active stages. Participants in

the action stage reported more psychological and health benefits than those in contemplation, and more health benefits than those in the maintenance stage.

The relationship between self-concept and exercise stage of change has also been investigated. Wyse and colleagues (1995) found that subjects in action/maintenance reported significantly greater scores than those in precontemplation/contemplation and preparation for global self-esteem, sports competence, physical condition and physical self-worth. They concluded that the "adoption and maintenance of regular exercise appears to be associated with feelings about the self in general and perceptions of the physical self in particular" (p.374). Perceived bodily attractiveness did not significantly differ between stages of change for females, but did for males with active males reporting higher attractiveness scores than inactive males.

The relationship between health-related beliefs and constructs from the Theory of Planned Behavior and the stages of change have also been examined. Blalock and colleagues reported that women who never-engaged in exercise had less knowledge about osteoporosis and weaker subjective norms than women in the other stages of change. Women currently engaged in exercise reported more exercise benefits and higher self-efficacy than those who had never participated or who had stopped participating. Women in the active stage reported more health motivation, greater self-efficacy, stronger beliefs in the effectiveness of exercise in reducing the risk of osteoporosis and fewer exercise barriers with respect to health concerns and inconvenience. Courneya (1995a; 1995b; 1997) reported significant differences between stages of change for perceived severity or seriousness of a health threat, beliefs, subjective norm, attitude, perceived behavioral control and intention. Courneya (1995a; 1995b), in examining the relationship between constructs from the Theory of Planned Behavior and stage of change, found that intention, attitude and perceived behavioral control were the most important discriminators among stages. Courneya (1997) also reported that perceived seriousness of a health threat from physical inactivity was found to separate those in precontemplation from contemplation and those in preparation from those in action and maintenance.

Most of the research investigating the relationship between stage of change and exercise determinants has been quantitative in nature. A few qualitative studies have been conducted to date. Gauvin (1990) conducted an exploratory, qualitative study in an attempt to "describe the cognitive, emotional and behavioral concomitants of direction, intensity and persistence for exercise in individuals displaying different levels of exercise involvement" (p.52). She reported that autonomous exercisers, those who were not enrolled in a formal fitness program, and fitness program enrollees were found to participate in exercise primarily for fitness and aesthetic reasons. Autonomous exercisers were found to like aspects of physical activity itself, reported not having to do anything in particular to make sure they exercise, and reported feeling energized after a workout. This was in contrast to the other types of exercisers who generally liked extraneous aspects of the exercise experience, had to push themselves and plan to ensure participation in exercise and reported feeling fatigued following physical activity. Although Gauvin (1990) did not employ the stages of change per se in her study, this investigation did capture differences in factors associated with involvement in physical activity for individuals at different levels of involvement in physical activity. She suggested that autonomous exercisers likely represent those in the maintenance stage of involvement while fitness program enrollees are likely in the adoption stage.

O'Brien Cousins and Keating (1995) conducted two strategic focus groups of women over age 60. One group represented physically active women involved in adult gymnastics at least twice a week as well as other activities such as fitness programs and yoga. The second group was comprised of inactive women who maintained their own households but were not involved in regular recreational physical activity. The purpose of the research was to explore variations in life course experiences that would explain later-life physical activity. All of the women were found to be physically active in girlhood and experienced similar role changes in adulthood. The inactive women expressed an awareness of lack of physical skills in childhood, viewed developmental challenges in girlhood as a reason to be less active, and saw their family roles as requiring self-sacrifice and often withdrawal from unnecessary physical tasks. Active women, however, viewed developmental challenges in girlhood as a reason to increase

activity as compensation and resisted the potential restrictions imposed by their family roles in adulthood to maintain their involvement in physical activity. Throughout life, active women seemed to be seeking or creating opportunities to be active, while inactive women used the same opportunities to remain sedentary. O'Brien Cousins and Keating (1995) suggest that women's perceptions at turning points in their lives provide an important influence in determining whether they will strive to be sedentary or active.

Leith and Shaw (1997) utilized a qualitative approach to study non-participation in physical activity. Twelve women who were considered low level participants by their participation rates and self-definitions of being inactive were interviewed about their individual feelings, perspectives and meanings concerning their sedentary lifestyle. Leith and Shaw (1997) indicated that there is a "need to take personal experiences and social interpersonal factors, as well as the conflicting nature of these factors, into account in understanding non-participation"(p.360) as many of the women they interviewed wanted to participate more even though they made no attempts to increase their participation in physical activity and indicated disliking physical activities. On the basis of their research, Leith and Shaw (1997) suggest that non-participation is explained by contradictory experiences that result from contradictory pressures.

By utilizing concepts from the Transtheoretical Model to examine determinants of physical activity participation, this research incorporates the innovative approach provided by the Transtheoretical Model to understanding behavior change through its ability to emphasize that different determinants may be more or less important at different facets in the change process. Research on the Transtheoretical Model has demonstrated that determinants vary across the stages of change. This suggests that in developing interventions to assist individuals to change behavior, different determinants need to be targeted depending upon stage of change.

Research to date, however, has largely focused on the psychological determinants to behavior change. The Transtheoretical Model is in essence a cognitive-behavioral model. As such, the model draws attention to the individual determinants of change rather than considering the environmental and cultural determinants of behavior. Research in the area of exercise psychology has indicated that a wide variety of

determinants, including personal attributes, environmental and situational determinants, are associated with this behavior. Little research has been conducted investigating the relationship between some of these other determinants, including constraints imposed upon individuals by other people or the environment, and facets of the change process. Little is known as to whether different determinants from this wide spectrum of potential determinants are more or less important across the stages of change.

In addition, much of this research has been quantitative in nature. Leith and Shaw (1997) suggest that to understand involvement and non-involvement in physical activity, not only must factors associated with participation be identified, but the ways in which they are experienced by individuals must also be considered. They suggest that there is a "need to take personal experiences and social interpersonal factors, as well as the conflicting nature of these factors into account" (p.360) in understanding physical activity involvement. The strength of utilizing qualitative approaches in examining exercise behavior is that it will assist in explicating experiences and providing in-depth descriptions of experiences that may assist in uncovering the complexities of exercise behavior.

3.3 Purpose of the Study

The purpose of this study was to examine, using both quantitative and qualitative approaches, the facilitators and barriers to involvement in physical activity for individuals representing the different stages of change for exercise.

The specific objectives of this study were:

- (1) To investigate similarities and differences in factors identified by individuals at different stages of the behavior change process that facilitate or constrain involvement in physical activity to identify differences in determinants for each stage transition;
- (2) To explore the context in which these factors are experienced by individuals at different points in the stage of change continuum to gain a more in depth understanding of how these factors are experienced.

3.4 Methods and Procedures

3.4.1 Design of the Study

The data utilized for this study was collected as part of a broader research project examining physical activity involvement among employees of a large urban hospital (Appendix A). The data utilized for this study was selected from aspects of the overall research project and included assessment of stages of change and facilitators and inhibitors to involvement in exercise collected through a questionnaire, and qualitative data collected through interviews with respect to facilitators and barriers to exercise involvement. The questionnaire data was utilized to initially identify factors that facilitate or constrain involvement in regular exercise in general and to make comparisons between these factors between the stages of change for exercise. Interviews were then conducted in order to validate and extend upon the questionnaire data by exploring facilitators and barriers with respect to specific behaviors identified by the subjects over the two year duration of the overall research project and to explore the context in which these factors were experienced.

Questionnaire Assessment of Facilitators and Barriers

An initial questionnaire was mailed to a random sample of 800 employees of a large medical institution investigating physical activity participation. The data utilized in this study was drawn from a questionnaire assessing stages of change and processes of change, and open-ended questions to identify exercise facilitators and barriers (Appendix E) along with a cover letter (Appendix F) that was mailed through the hospital mailing system, six-months after an initial questionnaire, to employees who completed the initial questionnaire (n=407). Respondents were also asked to indicate if they would be willing to be interviewed and an informed consent form was provided (Appendix G). A return envelope was included to simplify the process of returning the questionnaires by mail. A follow-up letter (Appendix H) was mailed two weeks after the questionnaire to thank early responders and to remind non-responders to return the questionnaire.

Qualitative Exploration of Facilitators and Barriers

Subjects who returned the informed consent forms agreeing to be interviewed were contacted 12 months following the questionnaire phase of the data collection. Face to face interviews were conducted and followed a semi-structured format. The interviewer asked the interviewee a series of questions from an interview schedule (Appendix P). The interview schedule included questions assessing changes in activity patterns over time during the previous two years of the overall study and factors associated with these changes. Interviewees were also encouraged to elaborate and extend upon any issues or ideas in order to bring forward their own perspectives. Interviews ranged in length from 40 minutes to an hour and a half. All interviews were tape recorded and transcribed 'verbatim'.

3.4.2 Instruments

3.4.2.1 Stages of Change for Exercise Behavior

The stages of change were assessed using Marcus, Eaton, Rossi and Harlow's (1994) Stages of Change questionnaire. Two-week, test-retest reliability with male and female employees of a medical centre was .78 (Marcus, Selby, Niaura & Rossi, 1992). Evidence for the construct validity of this measure has been presented in that it has been related to the processes of change (Marcus, Rossi, Selby, Niaura & Abrams, 1992), decision making and self-efficacy in a manner consistent with theory (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992; Marcus, Selby, Niaura & Rossi, 1992; Marcus, Eaton, Rossi & Harlow, 1994). Marcus & Simkin (1993) demonstrated the concurrent validity of this measure with the Seven-Day Physical Activity Recall Questionnaire as univariate tests revealed significant between-group differences for vigorous and moderate activity indicating that the stage of change measure is associated with another measure of physical activity. Marcus, Eaton, Rossi and Harlow (1994) suggested that a shortened version of their questionnaire could be used in future studies in order to increase the numbers of individuals able to be categorized by the measure. In

this study, a shortened version of this questionnaire was designed in which individuals are presented with five statements corresponding to each of the stages of change and respondents were asked to pick a statement that best describes their current exercise behavior (Appendix L). Cardinal (1995: 1997) reported a test-retest reliability of $r=.93$ to 1.00 for this shortened version of the stage of change measure.

3.4.2.2 Facilitators and Inhibitors

The factors that facilitate or inhibit involvement in exercise were assessed using a series of open-ended questions. As part of the questionnaire, individuals were asked to indicate barriers and facilitators to their involvement in exercise. Individuals representing the precontemplation, contemplation and preparation stages were asked to report those factors that constrained involvement in exercise and those factors that were expected to facilitate more involvement in exercise. It was assumed that active individuals would not identify barriers preventing their activity as they were already active. Active individuals, however, were asked to report those factors that facilitated their involvement in exercise. Therefore, subjects responded to different open-ended questions based upon their response to the stage of change scale.

Subjects categorized as Precontemplators were asked, "Is there anything that has impeded you from participating in exercise?" and "Is there anything that might cause you to consider beginning to exercise?". Contemplators were asked, "Is there anything that has impeded you from participating in exercise?" and "Is there anything that might help you to begin to exercise?". Preparers were asked, "Is there anything that might help you to participate in regular exercise?" and "Is there anything that has impeded you from participating in regular exercise". Those in the Action and Maintenance stages were asked "Is there anything that has assisted you in participating in regular exercise?".

3.4.2.3 Interview Schedule

The interviews included questions assessing physical activity in one's lifestyle and the meanings of exercise, physical activity and active living, changes in activity patterns over time during the previous two years of the study and factors associated with these

changes, and sources of enjoyment in physical activity. A schedule of the interview questions used for this study is presented in Appendix P. In particular, facilitators and barriers were assessed by asking study participants to elaborate on their physical activity involvement over the previous eighteen-month period and to discuss whether their activity patterns were stable or whether any changes occurred. Individuals were then asked what caused their activity to stay the same or change and were asked to elaborate upon any factors they identified.

3.5 Results

3.5.1 Description of the Sample

The data utilized for this study was collected as part of a larger research project investigating involvement in physical activity. Six months after the overall research project began, employees of a hospital (n=123) completed a questionnaire assessing exercise stage of change, facilitators and barriers.

Subjects who completed this questionnaire were also asked if they would be willing to participate in an interview. Interviews were conducted twelve months after the completion of the questionnaire. Although thirty-two individuals initially indicated a willingness to be interviewed, eight more individuals refused to participate when contacted. Six other individuals were unreachable at the time of interviewing, leaving an interview sample of eighteen individuals. This method of selecting an interview sample was utilized as collection of the qualitative data through retrospective interviews was intended to extend and elaborate on the quantitative data collected over the 18-month duration of the larger research project.

The demographic profile of the participants who completed the questionnaire and were interviewed is presented in Table 3-1. Compared to those who completed the questionnaire, individuals who were interviewed consisted of a higher percentage of full-time employees, males and paramedical technical/professionals, and a lower percentage of nurses. No significant differences were found between the inactives, preparers or actives on any demographic variables (Appendix R).

**Table 3-1
Demographic Profile of Study Participants**

Demographic Variable	Questionnaire (n=123)	Interviews (n=18)
Age	42.77 yrs	44.5 yrs
Gender		
Male	21 (17.2%)	5 (28%)
Female	101 (82.7%)	13 (72%)
Employed Full-time	84 (69%)	15 (83%)
Employed Part-time	28 (23%)	3 (17%)
Shifts		
<12 hour shifts	54 (43%)	2 (11%)
>12 hour shifts	22 (18%)	2 (11%)
Occupational Category		
Support (General & Clerical)	17 (14%)	3 (16%)
Paramedical Technical/Professional	33 (26%)	7 (39%)
Nurse	60 (48%)	5 (28%)
Manager	8 (6%)	2 (11%)
Other	7 (6%)	1 (5%)

3.5.2 Facilitators and Barriers

Facilitators and barriers to exercise were assessed and analyzed in two ways in this study. The first involved an analysis of the questionnaire data. The second involved analysis of the interview data. In both analyses, factors were coded and comparisons were made based upon differences and similarities in factors identified by individuals representing various exercise stages of change. Stage of change categories were collapsed into three stage of change groups (precontemplation/contemplation, preparation, action/maintenance) for the purpose of conducting statistical analyses due to small sample sizes in some stage categories.

3.5.2.1 Questionnaire Data

The responses to the open-ended questions regarding barriers and facilitators to involvement were analyzed using content analysis procedures to code the data. Words and phrases were carefully read and the initial descriptive codes were developed for types of factors identified in the open-ended questions. Initial categories were then compared to

each other and grouped together several successive times into higher order categories. Once the barriers and facilitators were coded, their frequencies were determined and are reported based upon respondents' stage of change in Tables 3-2 and 3-3 respectively. The frequencies represent the number of times each factor was mentioned by the subjects. A chi square analysis to examine differences between the stages in reported frequencies of factors for both the barriers and facilitators. These analyses revealed that there were statistically significant differences between the stages of change for the barriers ($\chi^2=11.18, p<.01$) but not for the facilitators ($\chi^2=5.00, p>.05$).

Table 3-2
Barriers to Exercise Involvement by Stage of Change
Frequencies by Stage of Change

Barrier	<i>Stage of Change</i>	
	Precontemplation or Contemplation (n=28)	Preparation (n=45)
▪ <i>Expressive Factors</i>	16	7
1. Personal Commitment		
(a) lack of enjoyment	3	-
(b) lack of motivation/determination	9	7
2. Identity/self-image	4	-
▪ <i>Instrumental Factors</i>	19	11
1. Psychological States/Conditions	11	2
2. Physical States/Conditions	8	9
▪ <i>Situational/Environmental Factors</i>	21	39
1. Social Support		
(a) lack of affiliation/companion	4	4
2. Availability of Opportunity		
(a) time	12	25
(b) cost	2	-
(c) convenience/accessibility	3	10

3.5.2.1.1 Exercise Barriers

The barriers were categorized into two major subdivisions – personal factors and situational factors. The determination to higher order categories, and in particular dividing categories into personal and situational/environmental factors, was influenced by categories of determinants of physical activity utilized in reviews of this literature (Dishman, 1991; Sallis & Dishman, 1994). The personal factors were differentiated into expressive and instrumental factors. This distinction was influenced by research in motivation that distinguishes between intrinsic motivation, in which individuals pursue activity for their inherent interest and enjoyment, and extrinsic motivation, in which individuals pursue activity for a particular outcome beyond the inherent interest in the activity. Expressive factors were considered to emanate from an individual's intrinsic self and thus were considered expressive of that self. In terms of barriers, these factors did not display the characteristics of intrinsic motivation and included having a lack of motivation, not enjoying exercise, and feeling embarrassment and self-consciousness about participating in exercise for a variety of reasons including age, weight and skill level. These factors were viewed as an expression of lack of intrinsic motivation due to lack of intrinsic desire, lack of enjoyment, and lack of perceived competence or capability to participate.

The second grouping, instrumental factors, represented factors that were not related to intrinsic motivation and thus were considered factors impinging upon individual's participation that were not associated to the individual's intrinsic desire, or lack thereof. These factors included various psychological states/conditions including feeling too stressed to exercise, having a physical injury or illness, and having a fear of injury, and physical states/conditions including experiencing physical discomfort while exercising and having a lack of energy. Situational/environmental factors were the third grouping of barriers and were considered external to the individual. They included social support and availability of opportunity.

In examining the frequencies in which the factors were indicated as barriers to involvement in exercise, it is evident that the most frequently cited barriers for precontemplators, contemplators and preparers are situational or environmental in nature.

Of these, lack of time was reported most as a barrier to increased activity participation. This is consistent with previous research on barriers to physical activity participation (Dishman & Sallis, 1994; Godin, Shephard & Colantonio, 1986; Stephens & Craig, 1990; Wankel, 1988). For preparers, more emphasis was placed upon situational barriers with lack of time being the most frequently cited barrier. Individuals in precontemplation and contemplation, however, indicated more personal, psychological factors such as lack of motivation and negative psychological states including lack of energy and stress due to work and family demands, as barriers to involvement than those in preparation.

Table 3-3
Factors Facilitating Exercise Involvement by Stage of Change
Frequencies by Stage of Change

Facilitator	<i>Stage of Change</i>		
	Precontemplation or Contemplation (n=28)	Preparation (n=45)	Action or Maintenance (n=45)
▪ <i>Expressive Factors</i>	8	10	15
1. Personal Commitment			
(a) enjoyment	2	-	2
(b) motivation/determination	1	7	1
(c) habit/routine	3	-	5
(d) lifestyle	1	3	1
2. Identity/self-image	1	-	6
▪ <i>Instrumental Factors</i>	7	7	15
1. Psychological Outcomes	2	2	3
2. Physical Outcomes	5	5	12
▪ <i>Situational/Environmental Factors</i>	29	57	46
1. Social Support			
(a) affiliation/exercise companion	5	18	13
(b) encouragement	1	3	3
2. Availability of Opportunity			
(a) time	13	16	1
(b) cost	1	2	2
(c) convenience/accessibility	5	18	16
3. Attraction/Stimulation			
(a) environment/nature	-	-	1
(b) activity	-	-	4
(c) reminders/prompts	4	-	6

3.5.2.1.2 Exercise Facilitators

In terms of facilitators, the categories that emerged were very similar to the identified barriers, incorporating personal and situational/environmental factors. However, there were several additional categories of facilitators identified indicating a wider variety of facilitating factors than inhibiting factors. The personal and situational/environmental distinction was made based upon previous categories developed in exercise determinants research (Dishman, 1991; Sallis & Dishman, 1994). With respect to the personal factors, the distinction was again made between expressive and instrumental factors, with expressive factors viewed as related to intrinsic aspects of one's self. Similar to identified barriers, the expressive factors included both personal commitment and self-identity aspects. Personal commitment included enjoying certain activities and wanting to participate in activity as well as integrating activity into one's lifestyle and making participation a habit. Factors related to one's identity, in order of prevalence, included experiencing relatedness to one's social network, one's values, and the environment, and experiencing self-acceptance from participating. These factors were viewed as emanating from and expressive of one's self and thus related to intrinsic motivation.

In terms of instrumental factors, individuals expressed a number of psychological outcomes resulting from participation including feeling less guilt, having more energy, feeling less stressed and having a sense of satisfaction from accomplishment and achievement. Physical outcomes mentioned as facilitators included better health, fitness and appearance. These factors were viewed as related to extrinsic motives rather than intrinsic motives and thus were considered instrumental outcomes.

In terms of situational/environmental factors, both social support and availability of opportunity were identified as facilitators. In addition, several factors that made activity attractive or stimulating for individuals were identified as facilitators. These included the environment surrounding physical activity experiences, the activity itself and incentives to participate (e.g. free club membership).

Although differences between individuals at various stages of change were not found to be statistically significant, some noteworthy trends exist. Active individuals tended to place greater emphasis on personal factors (expressive and instrumental) and in particular indicated physical outcomes of exercise (improved health, fitness, appearance) to be facilitators much more than did inactive individuals or preparers. Preparers tended to place the most emphasis on situational/environmental factors. Participating for companionship and having convenient opportunities to participate were found to be important factors for preparers and active individuals, but not for inactive individuals. Inactive individuals and preparers indicated that having more time would facilitate them to become more active. However, active individuals did not consider this an important facilitator to their involvement in exercise.

3.5.2.2 Interview Data

In follow-up to the questionnaire data obtained regarding facilitators and barriers, individuals were asked to reflect upon the two-year duration of the larger research project and identify and elaborate upon their reasons for being involved or not being involved in physical activity. In the interviews, individuals were probed to examine their activity patterns and their reasons for involvement/non-involvement and were encouraged to provide more detailed descriptions of the barriers and facilitators identified and their context, in order to make comparisons and elaborate upon the responses provided through the questionnaire. Similar to the questionnaire data, a number of facilitators and barriers were identified and categorized into three broad categories: expressive factors, instrumental factors and situational/environmental factors.

The interviews were transcribed and transcripts were analyzed inductively. Patterns and themes that emerged from the data were identified. The process undertaken was the constant comparison technique (Glaser & Strauss, 1967) in which initial descriptive codes were developed to represent the experiences and ideas expressed by the subjects. Each document was read line by line, word by word in order to identify categories. The transcripts were then re-read with these initial codes in mind to ensure all data had been coded. . Q.S.R. NUD*IST (Non-numerical Unstructured Data Indexing

Searching and Theorizing) software was utilized to facilitate this analysis. Q.S.R. NUD*IST is a relational database program that permits transcribed interviews to remain intact while allowing connections between text units to be established, coded and saved, aiding in the development of themes. Coding nodes were established for the most specific codes. These specific codes were then grouped into higher level categories. Comparisons were made both within and between interviews in terms of both consistencies and inconsistencies. The data was then organized according to these emergent codes and patterns.

The questionnaire data was collected in reference to participation in regular exercise in general in order to provide initial data with respect to stage of change differences in barriers and facilitators of involvement. The interviews were intended to extend upon this initial analysis and probe more deeply into the barriers and facilitators for specific changes in all types of physical activity behaviors occurring over the two year duration of the study. In both the questionnaire and interview data, factors were coded and frequency counts were compared between the stages of change and between the questionnaire and interview data in order to examine similarities and differences in identified barriers and facilitators between the stages of change and different activity references. Further analysis of the interview data was conducted to extend upon the identification of factors and explore the context in which these factors are experienced.

The frequencies that each of the barriers and facilitators were mentioned in the interviews was determined and compared to the frequencies derived in the questionnaire data in order to compare the results of both types of data collection techniques. Comparisons were made between stage of change categories. Stage of change was not assessed in the interviews. However, individuals descriptions of their activities and intentions were found to be consistent with their stage pattern movement over the previous 18-month period. As a result, interview subjects were grouped into one of three categories, namely, inactive, preparer, and active, based upon their stage of change movement over the previous 18-month period, and their descriptions of their activity involvement and intentions.

Individuals were categorized as inactive if they indicated being in precontemplation or contemplation in at least two of the three data collection periods. These individuals were involved in daily living activities but did not intend to do more activity nor were they thinking about doing activity in the distant future. Individuals were categorized as preparers if they indicated being in preparation in at least two of the three data collection periods. These individuals were involved in daily living activities as well as occasional leisure-time physical activities such as swimming, walking, cycling and skating. Some of these individuals were satisfied with their current activity levels whereas others were committed to becoming more active and were making plans to do so. Individuals were classified as active if they indicated being in action or maintenance in at least two of the three data collection phases. These individuals had incorporated exercise into their lifestyle and tended to be involved in more vigorous, higher intensity activities including aerobics, running, weight training and skipping rope. These individuals believed that they were sufficiently active and did not intend to do more activity, therefore they did not discuss barriers to becoming more involved in physical activity. The only individual that indicated being active over two of the three questionnaire data collection periods but was not classified in the active category for analysis was the individual that displayed the Contemplation-Action-Action stage movement pattern. When interviewed, this individual indicated that she had subsequently stopped taking an aerobics class that she had been involved in as the class was cancelled, but indicated that she was looking into beginning another fitness class again in the immediate future. As a result, this individual was classified into the Preparation category as she largely discussed the barriers and facilitators in terms of her current physical activity involvement. The stage of change patterns of those interviewed and their categorizations are presented in Table 3-4.

Table 3-4
Subjects who Completed Interviews
Stage of Change Patterns and Frequencies

Stage of Change Pattern	Frequency
<i>Inactive</i>	<i>4</i>
Precontemplation-Precontemplation-Precontemplation	1
Precontemplation-Precontemplation-Contemplation	1
Contemplation-Contemplation-Preparation	1
Action-Contemplation-Contemplation	1
<i>Preparers</i>	<i>8</i>
Preparation-Contemplation-Preparation	3
Preparation-Preparation-Preparation	2
Preparation-Action-Preparation	1
Preparation-Maintenance-Preparation	1
Contemplation-Action-Action	1
<i>Actives</i>	<i>6</i>
Maintenance-Maintenance-Action	1
Maintenance-Preparation-Maintenance	1
Maintenance-Maintenance-Maintenance	4
<i>Total</i>	<i>18</i>

Results of the frequencies for barriers to activity are presented in Table 3-5. Facilitators are presented in Table 3-6.

Table 3-5
Barriers to Activity Involvement
Reported Frequencies of Interview Data

Barriers	Inactives (n=4)	Preparers (n=8)	Total Reported Frequency
A. Expressive Factors	3	6	9
1. Personal Commitment			
(a) lack of enjoyment	2	3	5
(b) lack of motivation	1	3	4
B. Instrumental Factors	7	11	18
1. Psychological States/Conditions	3	4	7
2. Physical States/Conditions	4	7	11
C. Situational/Environmental Factors	8	15	23
1. Social Support			
(a) lack of affiliation/companion	2	2	4
2. Availability of Opportunity			
(a) lack of time	4	8	12
(b) cost	1	-	1
(c) convenience/accessibility	1	5	6

Table 3-6
Anticipated and Actual Facilitators
Reported Frequencies of Interview Data

Facilitator	Inactive (n=4)	Preparers (n=8)	Actives (n=6)
A. Expressive Factors	-	4	6
1. Personal Commitment			
(a) enjoyment	-	4	4
2. Identity/self-image	-	-	2
B. Instrumental factors	2	15	22
1. Psychological Outcomes	-	9	11
2. Physical Outcomes	2	5	11
3. Social Outcomes	-	1	-
C. Situational/Environmental factors	8	10	5
1. Social Support			
(a) affiliation	2	4	2
(b) encouragement	1	1	2
2. Availability of Opportunity			
(a) time	2	3	-
(b) cost	-	-	1
(c) convenience/accessibility	-	2	-
3. Attraction/Stimulation			
(a) rewards	1	-	-
(b) traumatic event	2	-	-

3.5.2.2.1 Exercise Barriers

Expressive Barriers

In terms of barriers to physical activity, two expressive factors were identified – lack of enjoyment and lack of motivation. Several subjects indicated that they did not participate in exercise or particular physical activities as it was not enjoyable – it was boring. One subject indicated “As far as my attitude goes, I’ve never been physically active. I never enjoyed sports or physical activity. I was never good at it. It’s never been my thing. I never enjoyed doing it”. Lack of motivation was mentioned as well. One subject indicated that she was “just not motivated enough to go out and exercise”.

Instrumental Barriers: Psychological States/Conditions

Several psychological barriers to participating in physical activity were identified by the subjects. These included lack of perceived competence, and lack of energy. Several subjects also indicated that they did not participate in activities as they did not feel competent enough to do so. One subject, referring to why she did not skate anymore commented, "I can never do it any better than I learned. I tried. I learned when I was about ten years old. I got to a certain level and it didn't seem to matter how many times I got out on the ice. I never got any better than that." Lack of energy was also identified as a barrier to participating in physical activity. Subjects made comments such as "I just couldn't quite get that get up and go" and "I think I would if I wasn't so worn out from work".

Instrumental Barriers: Physical States/Conditions

Several barriers related to the subjects physical condition were also identified including physical illnesses such as arthritis, the experience of physical pain ("It hurts my hips"), physical injuries (dislocated shoulder, knee injury), the individual's physique ("I am heavy chested so I can't run") and one subject referred to the embarrassment of sweating a lot as being a deterrent to participating in physical activity.

Situational/Environmental Barriers

Barriers associated with the opportunity to participate were also identified by the subjects. These included lack of time, lack of social support, the class being discontinued, cost of participating and convenience. A number of subjects mentioned lack of time as being a barrier to participating. Reasons for having a lack of time to exercise included work, family and other commitments. Work schedule was a factor identified as affecting regular involvement in exercise. One subject stated "Time is a big factor and that is one reason why I can never stick to one activity. Because my schedule always stops me from doing one activity at one time of day." Referring to exercise, another subject commented, "In order to do it properly you must be consistent. Between

my schedule and scouting activities I can't maintain a consistent exercise plan". The commitments of family and other activities were also identified as reasons why the subjects did not have time for exercise. One subject stated "If it's not the children and their activities, it's meetings or shopping or whatever else needs to be done in the evening". Another commented "I played basketball but I became a single parent. My life evolved around work and taking care of the children". Subjects also indicated that not having someone to do the activity with was a deterrent to participate. One subject indicated that "I would cross-country ski if I can get one of my kids to go with me". Another indicated "Not many of my friends do cross-country skiing. If there was somebody who was right next door and cross country skied I would probably do a little bit more." Other reasons for not participating included the classes that two of the subjects were taking were discontinued. One subject indicated that the fitness club that she was a member of went out of business and there wasn't one close enough to her home to make it worthwhile. Another subject mentioned the cost of certain activities as being prohibitive to doing them.

3.5.2.2.2 Exercise Facilitators

In terms of facilitators, two major sub-categories emerged from the data – anticipated facilitators which were identified as factors that would assist inactive individuals and preparers to become active or more active, and actual facilitators which were factors that individuals identified as actually having assisted them in being active. The actual facilitators identified by the subjects in this study were categorized into expressive factors, instrumental factors and situational/environmental factors.

Expressive Facilitators

In terms of expressive factors, individuals indicated that they enjoyed being active or enjoyed participating in particular activities. In referring to golf and skiing, one subject stated "I do those because I love to do them and I think I like them both very much". One's self-image ("I have a personal commitment to stay healthy both physically

and mentally". "I have a health and fitness attitude and belief") was also identified as facilitating involvement.

Instrumental Facilitators

Individuals also indicated being involved due to outcomes resulting from participating in the activity including psychological, physical and social outcomes. Psychological/emotional outcomes included feeling better as a result of participating. Feeling better reflected psychological/emotional improvement. These included feeling less guilty, improved mood, feeling more positive about oneself ("to feel good about yourself and what you are doing"), more energy ("I feel better, more energized", "I don't have that dragged down feeling"), feeling more relaxed ("I feel more relaxed, not in a sleepy way but in a calm way", "I feel that it gives you a vent to channel out stress"), and gaining a sense of satisfaction or accomplishment ("I feel like I have accomplished something"). Also assisting subjects to be active was experiencing various physical benefits from participating in exercise, including improved physical appearance, fitness and health. In terms of external outcomes, one subject identified the importance of being a role model for children as a reason for being active.

Situational/Environmental Facilitators

The importance of social support for being involved in physical activity was also identified by the subjects in this study. Both encouragement from others ("My kids will encourage me", "I was working with a girl who was a good motivator") and the opportunity to participate and socialize with others ("cycling, skiing and walking I've done because others can participate in them", "I went with two other friends and it was a good comraderie to go to the club") were considered important for participating. Other factors identified as being important to facilitating involvement in physical activity were low cost ("I kept it up because it was cheap"), being involved in physical activity in the past ("I have always swam"), convenience (referring to cycling, "it's not the same effort as gathering up exercise clothes and driving over to the gym"), and time due to decreased

family commitments ("As you get older you aren't quite as involved with the kids, so now I have some time).

Individuals also indicated that having more free time, the occurrence of a traumatic event ("Illness or my husband died, you know something traumatic happened in your life that set you off", "only if I had a major health issue, but nothing else, would make me do it"), and setting up a reward system would assist them to become active. Having more free time available due to decreased work and family commitments was identified by several subjects. In referring to not working anymore, one individual indicated "I would then have the daytime hours to go to the mall and walk around a bit. Not shopping because I hate shopping. If I wasn't working I think I would like to take a swimming class". One subject also commented in referring to her children, "when they get older, like 16 or 17, and they go off and do their own thing, and they don't come home for supper on time, then I will deal with that new lifestyle".

2.5.2.2.3 Stage of Change Comparisons

The frequencies in which the barriers and facilitators were mentioned were determined and compared based upon respondents' stage of change. Chi square analysis was significant for the facilitators ($\chi^2=14.478$, $p<.01$), but not for the barriers ($\chi^2=.457$, $p>.05$). Some noteworthy trends and similarities to the questionnaire data may be noted. In examining the frequencies in which these barriers were mentioned by the subjects who were interviewed, it is evident that most of the barriers identified were situational/environmental in nature with lack of time being the most frequently cited barrier. The presence of physical and psychological states or conditions were also seen by inactive individuals and preparers as inhibiting their involvement in exercise. In terms of the facilitators, active individuals indicated experiencing the psychological and physical benefits as important to facilitating their involvement in physical activity. Inactive individuals, on the other hand, tended to view situational/environmental factors as being able to facilitate their physical activity participation.

3.5.2.2.4 Facilitator/Barrier Contextual Descriptions

In addition to identifying barriers and facilitators, determining the frequencies in which they were mentioned by the subjects in this study, and making stage of change comparisons, analysis was conducted to examine the context behind subjects descriptions of their exercise facilitators and barriers. Differences in self-defined physical activity levels, intentions and commitment to intentions were found to influence the extent to which barriers and facilitators were salient concerns for individuals.

In discussing their behavior, subjects made distinctions between physical activity and exercise. Physical activity was seen as activity that is participated in because it is fun, spontaneous, part of the routine of life, and does not require a conscious effort. Physical activity was seen as including a variety of types of activities such as a variety of sports (skating, golf, skiing) as well as daily living activities such as walking, playing with grandchildren, and taking the stairs at work and at home. Exercise, on the other hand, was viewed as structured, planned, regular activity that was done for instrumental outcomes including improved health and fitness. These definitions were consistent for inactives, preparers and active individuals.

Although individuals' general definitions of physical activity and exercise were very similar, the subjects differed in identifying sufficient levels of activity and how much activity was required in order to define oneself as active as well as in their intentions to be more active. Differential emphasis was found to be placed upon barriers and facilitators depending upon an individual's stage of change.

Active Individuals

The differing definitions of physical activity and exercise influenced perceptions of sufficient activity levels. Individuals who considered themselves to be involved in exercise believed that their activity levels were sufficient. All individuals who were involved in what they defined as exercise were categorized as being in the action or maintenance stage. One maintainer stated:

If I am not doing what is obvious exercise like going to the weight room or the pool or the jogging track – the type of work that I do at home in the

yard or in the house. I have changed that into a workout. I find that I push myself to do everything in the space of an afternoon so that I'm working up a sweat and I am bending and stretching just as if I were in a gymnasium. If I do that in a day, my exercise has been completed or satisfied for that day.

Barriers were not an issue for active individuals, but rather these individuals tended to discuss factors facilitating their involvement. These individuals had integrated physical activity into their daily life, viewed physical activity as something that they wanted to do and had found ways to do it when factors temporarily disrupted their participation. Barriers were something they had overcome in the past and would be overcome again the future if necessary, but barriers to participation were not a salient concern. Active individuals discussed their activity as being integrated into their daily life, and when sessions were missed, it was not viewed as a failure but rather a normal aspect of life with the knowledge that participation would resume again. One active individual stated:

Sometimes I don't do anything for a week, two weeks. I don't have any conscious effort to do anything. Sometimes I just don't feel that I have the energy. Whether I have some sort of low grade flu or whatever that keeps me holding back and I feel dragged down – I don't push myself. And other times I feel really energetic and I do something at least relatively strenuous every second day. And that can continue for two or three months and then I'll have a hiatus again for whatever reason. Christmas and family and those types of things get in the way of doing or following your normal routine. But I never push myself to do something. I know it's part of my life and I know I'll be doing it again so there is no reason that I should flog myself for not having done it this past week. I don't punish myself.

Another active individual talked about how she integrated activity into her daily life and emphasized that she participated because it was something she wanted to do, not something she felt she had to do:

I think we really are an active family, but I don't do them for exercise (referring to running, aerobics and playing slowpitch). I do them for enjoyment. I think I am the type of person that just can't sit....I think if I had to do it, it would probably turn me off. I probably wouldn't do it. I guess I also want to keep being active. I dread the day when you just can't do the same things. I don't want to ever look back and think I wished I would have done that. I just want to do it all now....I think I just like being active. No matter what I am doing I am happy. If I was just sitting around I must say I would become a very unhappy person. I like to be active.

In talking about walking over the lunch hour, another active individual commented:

It's something I do for myself, not because of others. It's something I prefer to do, I go even when it's thirty below unless other circumstances prevent it. It's something I pride myself on.

Another active individual discussed how she had integrated activity into her daily life, but if she does miss a workout she doesn't get upset about it. When asked about her feelings after missing a workout she commented:

I'll do it next time. There are reasons why I miss, it wasn't a deliberate plan. There's no sense trying to change things I can't control. Usually it's something that's completely out of my control.

Yet another active subject talked about integrating activity into her life:

I plan it into the day so that it doesn't get left over. There really isn't time for it. There are a lot of things I could be doing. It would be easy to say I don't have the time. I tell myself that it is important and I deserve it.

In-Active Individuals and Preparers

Individuals involved in physical activities differed in their views of themselves as active individuals and in the way that they viewed daily living activity. Some individuals

who were categorized as inactives and preparers did not see themselves as being physically active when involved in daily living activities such as walking and taking the stairs, and felt that they should be exercising more. Others, however, saw themselves as being active with their daily living activity and perceived it as a sufficient amount of physical activity and thus did not intend to participate in more activity.

(1) Individuals with no intention to participate more

Some individuals at both the inactive and preparation stages were found to be involved in daily living activities and to have no intention to participate in more activity. Individuals who were involved in daily living activity and did not intend to participate more were found to consider their current daily living activities as sufficient, to not see value in being more active, to be in denial of their need to exercise more, and to rationalize their non-involvement. Barriers and facilitators to involvement tended to not be an issue for these individuals as they were content with their current activity levels and thus were not focused on barriers preventing increased participation. They viewed their activity as something they did as part of daily living and thus did not discuss particular factors facilitating their involvement as it was just something done as part of daily life. What was pronounced for these individuals was their rationalizations for their current levels of involvement. For example, one inactive individual placed a higher priority on being with her family in her free time than being physically active. She rationalized her non-involvement as she didn't want to take time away from her family to exercise. The subject explained:

The problem is that I come here to work, and I want to get home as soon as I can to be with my kids when they get home at 4:00 pm. So therefore, I can't break up my day and add an extra hour at the end of my day. I mean, sure I can go home at 5 or 6 pm from here (work), it wouldn't matter, but I don't want to do that because I want to be home with my kids.

This subject continued to rationalize her lack of involvement by stating that even though she would like to lose weight, being active wouldn't help her to lose weight. Referring to her parent's change in lifestyle she stated:

They exercise all winter when they are down in Phoenix, Arizona. Maybe that's why I don't do it. Nothing seems to change for her (referring to her mother). I know she gets up at seven in the morning, they go for a walk, she goes to an aerobics class, and nothing ever seems to change.

One inactive individual indicated that she participated in physical activity in her daily life, and saw no need to do additional exercise. She did not view herself as an exerciser and when asked if she intended to become more physically active stated:

No, only if I had a major health issue but nothing else would make me do it. I don't think that I need to add an exercise routine to my physical activity schedule. Physical activity is incorporated into my life. I get a fair amount of activity already with working as a nurse and at home.

One preparer also indicated that he was participating in daily physical activity and viewed himself as being active and was content with his current activity levels. He stated that after experiencing injuries from a car accident he still wanted a little bit of activity but did not see himself being able to participate in regular exercise:

I imagine the more aggressive sports like jogging, I see myself doing less and less of. I see no reason why I should take off on things like skiing and golf or camping for that matter.

Another preparer spoke of the importance of an active lifestyle, but did not see a need to exercise:

I think it's important to try and maintain some sort of activity. Just in terms of being generally more active. So it's part of your lifestyle. I guess it depends on what you consider exercise as well. Certainly doing situps every day and doing aerobics and that sort of thing I don't feel compelled to do. But in terms of taking stairs I do that sort of thing.

(2) Individuals with intentions to participate more

Some individuals who were categorized as inactive and preparers expressed intentions to become more active. These individuals were not content with their current activity levels and intended to do more. Differences were found in the level of commitment to these intentions. Some individuals expressed vague intentions to become more active at a future time. Barriers to participation were salient for these individuals. These individuals identified numerous reasons for not being able to participate more.

Several inactive individuals expressed an interest in beginning activity in the future, but did not have immediate plans to become active and were undecided as to how or when they would become active again. One inactive individual indicated that due to a back injury, lack of enjoyment and other commitments, he was having difficulties being involved in exercise. He stated:

Last year, I reached the stage I got quite desperate because I couldn't exercise but I wanted to. I joined an exercise course. It's in the evening. I hate exercising over the lunch hour. It just doesn't interest me at all. And I am not a morning person. That went twice a week. I joined that really out of frustration. I quite liked it and then I never went back this fall because even though it got me moving, it wasn't aerobic. I didn't feel that I was getting enough out of it. It wasn't what I wanted from an exercise class. Also last year, I don't remember why, but I am getting more and more committed to doing things in the evenings. So now I am doing less again. I really don't like this and I don't quite know what to do about it....I really don't know what I am going to do. I am just not motivated.

Several individuals expressed an interest in being more active, but were focused on barriers preventing their participation. One preparer indicated:

I sure would like to – I think the only way I ever will is if we make substantial changes. My wife works. Lack of discretionary time and energy. Not a whole lot of opportunities, never feel you have a chunk of time that you feel clear-headed enough. May try to get more activity at home.

Another preparer, in reflecting over the previous two-year period stated:

My lifestyle hasn't changed and my ability to exercise hasn't changed....I keep meaning to and never quite get around to it but that hasn't changed in the last two years.

Another preparer who wanted to become more active, thought that he could become more active in retirement.

I would like to retire. I'd like to move to the Okanogan and probably then I'll have time on my hands that I can use to do something more on a regular basis and not feel like I'm tired out from work and need to relax...I would like to probably go curling once a week and seeing as they have several ski resorts there I thought in the back of my mind maybe I could get into the beginners hill or something and maybe get involved in that.

These individuals expressed a lack of contentment with their present activity levels. As one preparer stated when asked whether she could foresee any changes in her physical activity participation in the future:

Well, I sure hope it's going to increase. For me it's something in the back of my mind and it has been bothering me for some time now. In the summer it wasn't so bad because we had holidays and we were out at the lake and doing something. But I know winter is approaching and I feel a real need to be doing something. I would like to go three times a week.

A common theme across all of these individuals was a focus on the current barriers preventing them from being more active. There were other individuals who were not as active as they wanted to be but were focused on identifying a solution to perceived inadequate activity levels and intended to take action in the immediate future

These individuals expressed a stronger commitment to following through on their intentions in the near future. They were not as focused on the barriers to their participation, but rather on factors that may facilitate their involvement. They were more focused on finding solutions to overcoming their perceived barriers.

One preparer's comments reflect this focus on making plans to overcome barriers:

Theoretically, I know its good for you and I know pretty well why, and what and how and I know I actually feel better when I'm (referring to being active)...and that's why if the aerobics class doesn't start, I'm going to have to make steps to do something on my own.

3.6 Discussion

This exploratory study provided information about the barriers and facilitators of physical activity for individuals at different stages of involvement in physical activity. Facilitators and barriers were identified in an open-ended manner in both questionnaire and interview data collection processes. In general, the results of this study provide evidence to indicate that different determinants are related to different stages of change for exercise and that emphasis on barriers and facilitators to involvement differs for individuals at different stages of change.

There exist a number of limitations that should be considered when interpreting the results of this study. The generalizability of the findings may be limited due to low sample sizes and the worksite population studied. Different studies need to be undertaken with different populations to provide further support of the generalizability of the findings. Due to small sample sizes, the stages of change were collapsed in order to obtain meaningful comparisons and to run statistical analyses. Therefore, differences between the precontemplation and contemplation stages, and the action and maintenance stages were not examined. Future research with larger sample sizes representing all five stages of change is required to further our understanding of determinants between the stages of change.

3.6.1 Facilitators and Barriers

The inductive approach used in this study assisted in identifying barriers and facilitators to participating in physical activity, most of which have been reported in previous studies. Many similarities existed in both the questionnaire and interview data in terms of the factors that were identified that facilitate or constrain involvement in physical activity. It was not surprising that factors identified as barriers to activity were also identified as facilitators as many individuals who identified a particular barrier viewed that removal of that barrier as facilitating their involvement. Similarities were also found in both the questionnaire and interview data with respect to the differences in reported barriers and facilitators to exercise by individuals representing different stages of change. Factors identified in both data sets included expressive, instrumental, and situational/environmental factors. Taken together, both data sets indicate that participation in physical activity is influenced by a variety of factors, including both personal and situational factors. Differences were found, however, in factors identified as facilitating or inhibiting involvement by individuals representing different exercise stages of change.

Situational and environmental factors were the most frequently cited barriers for precontemplators, contemplators and preparers. Of these, lack of time was reported most as a barrier to increased activity participation. For preparers, lack of time was the most frequently cited barrier. Individuals in precontemplation and contemplation, however, indicated more psychological factors as barriers to involvement than those in preparation. This suggests that in addition to addressing situational/environmental factors, interventions targeting psychological factors may be particularly important in developing the intention to adopt exercise and to develop commitment to that intention. This is consistent with Godin's (1994) suggestion that social-cognitive variables are predisposing factors that involve the decision-making processes that underlie and precede action.

In terms of facilitators, those involved in activity indicated the outcomes derived from involvement as a facilitator much more than inactive individuals. This finding

suggests that experiencing physical health, fitness and appearance benefits reinforces participation and facilitates involvement in exercise. Participating for companionship and having convenient opportunities to participate were found to be important factors for preparers and active individuals, but not for inactive individuals. This suggests that environmental supports, and in particular companionship and convenience, are particularly important in order for individuals to act upon their intentions in adopting and maintaining exercise behavior. Inactive individuals and preparers indicated that situational/environmental factors would facilitate their involvement and that in particular, having more time would facilitate them to become more active. However, active individuals did not consider this an important facilitator to their involvement in exercise. This suggests that lack of time as a barrier to participation may be more a reflection of activity priorities for inactive individuals

This study extended upon previous research in the determinants of physical activity by utilizing a qualitative approach to examine the context in which the facilitating and inhibiting factors were experienced by individuals representing different stages of exercise behavior change. The findings of this study indicated both support and weakness of the application of the stage of change construct to examining exercise barriers and facilitators.

In support of the stage of change construct, individuals were also found to display three types of intentions to be active. Individuals were found to not intend to participate in more physical activity, to intend to participate sometime in the future but were undecided as to how or when, and individuals expressed commitment to their intentions, desiring to increase their activity levels in the near future and were making plans to do so. Barriers were not a concern for individuals with no intention to become more active. These individuals were satisfied with their current activity levels. Inactive individuals with no intentions to participate in more activity focused on their rationalizations for their current behavior. Active individuals valued and enjoyed the activity or the outcomes resulting from participation, wanted to be active and talked about persevering through constraints therefore barriers were not a salient concern for them. Individuals with general intentions were found to focus on the barriers to activity, whereas individuals

who had developed a stronger commitment to be active were focused on solutions to overcoming their barriers.

These findings provide support for the applicability of the stage of change construct from the Transtheoretical Model to exercise in terms of intentions to be active. Similar to qualitative research conducted in the area of smoking cessation (Prochaska & DiClemente, 1982), individuals in discussing their exercise behavior displayed these qualitative differences in intentions to be active. Similar to research with other behaviors, individuals in exercise expressed characteristics of the stages of change conceptualized by Prochaska and colleagues. Individuals who did not intend to do further activity but were not exercising regularly were found to rationalize their non-involvement or deny their need for regular exercise. This is a characteristic that Prochaska has identified for individuals in the precontemplation stage of change. Individuals were also found to express vague intentions to participate in the future but perceived barriers as preventing their participation which is characteristic of the contemplation stage of change. In addition individuals expressed commitment to intentions to change behavior in the near future and to making plans to change behavior, which is characteristic of the preparation stage.

In examining the context in which facilitators and barriers to exercise were experienced, this study also indicates challenges in utilizing a self-report stage of change approach in measuring level of activity involvement. In particular, this study found that individual's self-perceptions of their activity levels influenced their stage of change classifications and that misclassifications likely occurred based upon the stage of change measure utilized.

In discussing their activity involvement, individuals were found to make distinctions between physical activity - activity that is a part of the routine of life and participated in for a variety of reasons including enjoyment and socializing, and exercise - activity that is structured, planned and done to gain the health and fitness outcomes associated with the activity. Although individuals generally agreed to the distinctions between the concepts and their definitions, their perceptions as to whether their current activity levels were sufficient based upon these concepts differed. Some individuals

viewed daily living as sufficient activity, whereas others did not. These findings suggest that researchers and practitioners need to pay attention to the words that are used in referring to physical activity/exercise behavior, and consider the influence of individual's self-definitions in assessing physical activity/exercise behavior through self-report measures such as the stage of change scale utilized in this study. Individuals may have different connotations to the meanings of these words.

Physical activity is difficult to measure as it is a diffuse and complex behavior. The results of this study draw attention to the influence of individual's perceptions of their current activity levels to the assessment of physical activity. Individuals who are quite active may not perceive themselves as being active, whereas individuals who are involved in only some daily living activities may view themselves as quite active. These findings provide further evidence for the challenge of accurately measuring activity levels. Based upon these factors, misclassification of individuals into stages of change likely occurred in the present study. Techniques such as self-monitoring involving feedback may assist in facilitating more realistic perceptions of activity levels and improve the accuracy of placement of individuals into the stage of change measure along with other objective activity level assessment techniques such as heart rate monitoring or activity monitoring (accelerometers).

In addition to the challenges of physical activity self-assessment, the results of this study also indicated a weakness in the stage of change measure. When interviewed, some individuals who were categorized in the preparation stage of change had intentions to participate more, whereas others did not intend to participate more. As a result, some individuals who did some physical activity, but did not intend to exercise more, may not have been accurately classified with the stage of change measure utilized in this study.

3.6.2 Implications for Practice

The results of this study provide suggestions as to the factors to be targeted through interventions to facilitate movement through the stages of change. Practitioners involved in facilitating physical activity need to address all levels of factors that influence participation in physical activity including personal, situational and environmental

supports. A variety of interventions are needed that provide supportive environments and social contexts and that facilitate individual behavior change.

The most commonly cited barrier in the present study was lack of time. Environmental policies and social supports can assist in addressing the objective lack of time individuals may experience. For example, supervisors in workplaces can be flexible in allowing individuals time in their workdays to exercise. Convenient childcare supports at sites for exercise can also assist individuals who may not otherwise be able to exercise due to the demands of child care. Lack of time may also be a reflection of activity priorities. Practitioners may assist individuals in assessing the amount of free time that is available in their lives through the use of time-use diaries, and assist individuals in perceiving physical activity as a priority. This may be accomplished by several different techniques. To assist individuals to change activity priorities, individuals need to gain awareness that their sedentary lifestyles are a problem. This can be accomplished by providing individuals with health-risk information associated with a sedentary lifestyle. As well, the decision balance sheet may be a useful tool to assist individuals in assessing the pros and cons they anticipate from exercising and to become aware of their values and how physical activity can support their values.

The results of this study also indicated that experiencing the benefits of physical activity involvement, having convenient opportunities to participate and having social support to participate are important for the adoption and maintenance of physical activity. Goal setting strategies that assist individuals to identify their desired attainments and to monitor their progress may be an important tool to ensure that they are aware of the outcomes they are experiencing. A number of strategies may be helpful in providing more convenient opportunities for individuals including providing physical space and facilities in many locations, encouraging individuals to incorporate activity whenever they can in their daily life, implement policies that provide realistic expectations in terms of employment demands, and provide supports for family caregivers. Incorporating social interaction into physical activity experiences may also be important so that individuals can receive social support in their activity choices.

3.6.3 Summary

The findings of this study suggest that determinants do differ based upon the stage of involvement in physical activity and that individuals at different stages of change differ in emphasis placed upon barriers and facilitators in describing their exercise behavior.

Inactive individuals and preparers viewed situational/environmental factors, and in particular time, as inhibiting ("lack of time") and potentially facilitating ("having more time") their involvement. This is consistent with previous research indicating that perceived lack of time is a significant barrier for inactive individuals (Dishman, 1991; Dishman & Sallis, 1994). Inactive individuals also tended to focus on personal reasons for being inactive. This is not surprising as it has been suggested that social-cognitive variables are largely influential preceding action (Godin, 1994; Prochaska, DiClemente, & Norcross, 1994).

Environmental supports were found to be important for preparers and active individuals. Active individuals also emphasized the importance of experiencing the physical benefits associated with participation in physical activity for their continued involvement. This supports previous research indicating that reinforcement, social support and other environmental stimuli are important for the adoption and maintenance of activity (Prochaska, DiClemente & Norcross, 1994).

The results of this study also indicated that individuals representing various stages of change place differential emphasis upon barriers and facilitators to be physically active. Inactive individuals and preparers with the intention to become more active tended to focus on and be more concerned about the barriers preventing their activity than inactive individuals and preparers who did not intend to become more active, who denied or rationalized their need for more activity. Active individuals, however, desired to be active, valued and enjoyed activity, had integrated vigorous physical activity into their daily life and believed they would negotiate through any barriers that arose. As a result, barriers were not a salient concern for active individuals.

The findings of this study also supported the existence of qualitatively different levels of intentions to be active, consistent with the Transtheoretical Model's stages of change construct. Individuals were found to have no intention to be more active, have a vague intention to be more active at a future point in time with no particular plans being made, and expressed commitment to intentions to become more active in the immediate future with specific plans to do so being made. The qualitative findings of this study indicated possible measurement problems with the stage of change questionnaire utilized. In particular, individuals classified in the preparation stage of change were found to display both intentions to be more active, as well as no intentions to be more active. The item used to measure the preparation stage of change in this study did not include a measure of intention. Therefore, individuals who were occasionally active that intended to do more activity, as well as those that were occasionally active and did not intend to do more activity were both categorized in the preparation stage. It is recommended that future research include a measure of intention in assessing preparation to ensure that those categorized into the preparation stage of change are intending and preparing to become more active, consistent with Prochaska's definition of this stage of change.

The findings of this study indicate that determinants of physical activity vary, and their relative importance varies, across the stages of change. The results of this study are consistent with other research on the determinants of physical activity involvement in that individual, situational and environmental factors were identified as influencing physical activity involvement (Dishman, 1991; Dishman & Sallis, 1994). Continued research that utilizes stages of change to examine associations with determinants may be useful in identifying the variables that are critical for stage movement over time. The results of this study suggest that a more complete understanding of physical activity participation will be gained by utilizing theories and models that hypothesize different levels of physical activity as being influenced by intrapersonal, social and physical environmental variables.

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CHAPTER 4

An Exploratory Investigation of the Sources and Levels of Physical Activity Enjoyment across the Stages of Change

4.1 Introduction

Due to the number of health-benefits associated with physical activity (Bouchard, Shephard & Stephens, 1994; Bouchard, Shephard, Stephens, Sutton & McPherson, 1990; Martinsen & Morgan, 1997; Raglin, 1997; Sonstroem, 1997), understanding physical activity involvement and the ways in which participation in this lifestyle behavior may be facilitated is an important concern for public health and health promotion. As a result, research has been undertaken in order to better understand this behavior. One model in particular that has been suggested as being useful is the Transtheoretical Model of Behavior Change (Prochaska, 1979).

The Transtheoretical Model proposes that exercise behavior change unfolds through a series of five stages, namely precontemplation (individual is not active and is not intending to become active), contemplation (individual is not active but intends to become active), preparation (individual is considering becoming regularly active in the next month and is making preparations to become active), action (individual has become regularly active in the past six months), and maintenance (individual has been regularly active for more than six months). The Transtheoretical Model also proposes that ten cognitive-behavioral processes are utilized differentially across the stages of change in the process of changing behaviors. The Transtheoretical Model approaches physical activity involvement as a health-related behavior in that it was derived from research on addictive and health-related behaviors. Research to date applying the Transtheoretical Model to exercise has demonstrated similar results to research applying this model to other health-related behaviors (Gorely & Gordon, 1995; Marcus, Eaton, Rossi & Harlow, 1994; Marcus & Owen, 1992; Marcus, Rossi, Selby, Niaura & Abrams, 1992; Marcus, Selby, Niaura & Rossi, 1992).

However, exercise, in addition to being a health-related behavior, is also a leisure behavior with individuals participating in it for many reasons other than solely to

improve their health (Frederick & Ryan, 1993; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997; Wankel, 1985). Therefore, models such as the Transtheoretical Model, that approach understanding exercise behavior for health reasons only do not capture the many motives underlying involvement in physical activity.

4.2 Enjoyment and Exercise

One factor that has been suggested as being important for involvement in physical activity is enjoyment (Heck & Kimiecik, 1993; Wankel, 1993). Research in the area of sport and exercise psychology has suggested that enjoyment is important in motivating involvement in physical activity (Heck & Kimiecik, 1993; Scanlan & Simmons, 1992; Wankel, 1993). Studies in youth sport have indicated that the desire for enjoyment has been given as a reason for participating in physical activity, and lack of enjoyment has been given as a reason for dropping out of physical activity (Gould & Horn, 1984). Some studies have also demonstrated that enjoyment is important for involvement in exercise (Heck & Kimiecik, 1993; Ingledew, Markland & Medley, 1998; Oman & McAuley, 1993; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997; Sallis et al., 1989) and that lack of enjoyment is a reason for non-participation (Leith & Shaw, 1997).

The study of enjoyment has largely been pursued within the context of intrinsic motivation. Enjoyment is often related to intrinsically motivated behaviors (Csikszentmihalyi, 1975; 1990; Deci & Ryan, 1985). Researchers in the field of intrinsic motivation have identified factors that will lead to the experience of enjoyment. According to Csikszentmihalyi (1975, 1990), enjoyment requires the use of skills and is experienced in situations whereby the perceived challenges of the activity match the perceived skills of the individual. Therefore, Csikszentmihalyi emphasizes perceived competence as being important for the experience of enjoyment. Deci & Ryan (1985) suggest that the degree of self-determination in the regulation of behavior influences the experience of enjoyment, with intrinsically motivated behaviors being experienced as the most enjoyable.

4.2.1 Sources of Enjoyment in Physical Activity

Theoretical research in intrinsic motivation has indicated the importance of enjoyment in the motivation of behavior and has provided some suggestions as to the sources of enjoyment. As enjoyment is considered important for participation in physical activity, the sources of enjoyment in physical activity settings has also been studied. Although understanding the factors that make physical activity enjoyable to the participant may be an important consideration in understanding and enhancing involvement in physical activity, there is a dearth of research investigating the sources of enjoyment in physical activity settings. The studies that have been conducted have generally investigated youth sport contexts. Numerous differences exist in this research (Brustad, 1988; Csikszentmihalyi, 1975; Chalip et al., 1984; Harris, 1984; Ommundsen & Vaglum, 1991; Wankel & Kreisel, 1985; Wankel & Sefton, 1989) in terms of the operationalization and measurement of the constructs under investigation and the research methodologies used. However, some consistencies in findings have emerged. Scanlan & Simons (1989) summarized this research by stating that perceptions of competence, challenge, elements of the activity itself, social interactions and extrinsic rewards have all been identified in several studies as sources of enjoyment in youth sport. The studies conducted to date provide an indication of the relative importance of these factors to the enjoyment of youth sport. Intrinsic factors such as skill development, excitement of the game, displaying competence and perceived challenge, appear to be the most influential sources of sport enjoyment. These factors are followed by social aspects including social interactions, friendship/companionship and being part of a team, and then extrinsic factors such as winning, pleasing others, prestige and external rewards.

Research in the sources of exercise enjoyment is limited with only two studies conducted to date, but it does suggest that there are similarities to the youth sport research, as well as some differences. Heck & Kimiecik (1993) conducted a study investigating the sources of enjoyment among 15 exercise maintainers who were involved in supervised weight training, aerobic dance and aerobic games programs. Using a qualitative approach, Heck and Kimiecik identified six dimensions: social support, environment, flow, competition, emotional and physical outcomes, and outlet

and distraction. The social support dimension included both affiliation with others and encouragement from others. Aspects of the environment such as fresh air and the beauty of one's surroundings as well as competition with oneself and others were also considered important to enjoyment. Some elements of the "flow" experience identified by Csikszentmihalyi (1990) were also described by the subjects in this study as contributing to their enjoyment of exercise including losing oneself in the activity, experiencing a natural high, and feelings of control. A number of positive feelings such as a sense of self-satisfaction, feeling good, fun and physical benefits such as the fitness results, were also sources of enjoyment. Other important sources identified by the participants in this study included getting away from work, doing something for oneself, stress reduction and mental relaxation.

Ryan, Frederick, Lepes, Rubio and Sheldon (1997) examined the relationship between motivational orientation toward exercise and enjoyment of exercise among a group of new participants to a university fitness centre. Enjoyment levels were not found to differ based upon differences in motives for participation, which included competence, appearance, fitness, enjoyment and social motives. Rather, higher scores on all motive dimensions were associated with greater workout enjoyment. Ryan et al. (1997) suggested that "regardless of the focus of one's initial motive, greater motivation appears to be associated with greater task enjoyment" (p.351). The results of this research suggest that any one particular motive is not more of a source of enjoyment than other motives but rather level of motivation influences the amount of enjoyment experienced. This study extends upon previous research on sources of exercise enjoyment by providing an indication of influences upon levels of enjoyment as well

4.2.2 Exercise and Enjoyment: A Summary

Research in motivation and exercise enjoyment provide another dimension in understanding physical activity involvement in addressing the many motives, in addition to health reasons, underlying participation in physical activity. The research on enjoyment of exercise is limited in that it has focused on participants in structured exercise programs and those who are already active. Most of the research on physical

activity enjoyment has been conducted within the context of youth sport. Only two studies have been conducted to date in adult exercise (Heck & Kimiecik, 1993; Ryan, Frederick, Lepes, Rubio & Sheldon, 1997). Research on sources of enjoyment in both youth sport and exercise settings indicate that the sources of enjoyment are diverse, involving intrinsic rewards, elements of the activity itself, social aspects and extrinsic rewards. This is significant in that it suggests that enjoyment in physical activity settings is experienced from more than what can be subsumed under the concept of intrinsic motivation. As well, the research on sources of exercise enjoyment is limited in that it has focused on participants in fitness activities and those who were active. More research is required on individuals involved in other physical activity contexts and who are at different levels of involvement in physical activity. According to Heck & Kimiecik (1993), "the factors that make exercise enjoyable in the early stages of exercise behavior (e.g. exercise initiation) may not be the same as the later stages of exercise behavior (e.g. exercise maintenance)" (p.19). Heck and Kimiecik (1993) further state that "future work may need to take more of a stages-of-change approach in examining exercise enjoyment to determine the mechanisms underlying this vital component of human experience at different stages of exercise behavior" (p.19). It is currently unknown whether individuals in different stages of involvement in exercise experience different levels of enjoyment and experience different sources of enjoyment. Research to date investigating enjoyment and exercise has approached physical activity involvement as an all-or-none phenomenon, considering differences between those who are active and those who are not active. The advantage of utilizing the stage of change construct from the Transtheoretical Model in investigating enjoyment of exercise is that it may further elucidate differences in levels and sources of enjoyment for individuals at various levels of involvement in physical activity. If enjoyment is important for physical activity participation, then investigating the sources of enjoyment across a variety of activity settings and levels of involvement may provide suggestions on how enjoyment can be facilitated in physical activity settings to enhance participation and adherence.

4.3 Purpose of the Study

The purpose of this study will be to explore the levels and sources of enjoyment for exercise for individuals representing the different stages of change. Relatively few studies have been conducted to date with respect to the exercise stages of change and enjoyment of exercise. As a result, the focus was to explore the relationship between levels of exercise enjoyment and exercise stage of change, and to explore the sources of exercise enjoyment from the participants' point of view for individuals involved in a variety of physical activities and at different levels of involvement in physical activity. As neither of these topics have been addressed to date in research on exercise and enjoyment, this study incorporated an exploratory approach to addressing these topics, utilizing both quantitative and qualitative methodologies.

The specific objectives of this study were:

(1) To examine the relationship between enjoyment and the stages of change to determine if individuals at different stages experience different levels of exercise enjoyment;

(2) To explore the sources of enjoyment of physical activity for individuals at various stages of involvement in physical activity.

4.4 Methods and Procedures

4.4.1 Design of the Study

The data utilized for this study was collected as part of a broader research project examining physical activity involvement among employees of a large urban hospital (Appendix A). The data utilized for this study was selected from aspects of the overall research project and included assessment of stages of change and level of exercise

enjoyment collected through a questionnaire, and qualitative data collected regarding sources of enjoyment in physical activity.

Questionnaire Assessment of Level of Enjoyment and Stage of Change

A questionnaire assessing stages of change level of enjoyment (Appendix I) along with a cover letter (Appendix J) was mailed through the hospital mailing system, twelve-months after an initial questionnaire, to employees who completed the first two phases of the overall research project (n=123). A return envelope was included to simplify the process of returning the questionnaires by mail. A follow-up letter (Appendix K) was mailed two weeks after the questionnaire to thank early responders and to remind non-responders to return the questionnaire.

Qualitative Exploration of Sources of Enjoyment

Subjects who returned the informed consent forms agreeing to be interviewed were contacted six-months following the questionnaire phase of the data collection. Face to face interviews were conducted with eighteen individuals who agreed and were available to be interviewed. All interviews followed a semi-structured format. The interviewer asked the interviewee a series of questions from an interview schedule (Appendix J). The interview schedule included questions assessing their involvement in physical activity and sources of enjoyment in physical activity. Interviewees were also encouraged to elaborate and extend upon any issues or ideas in order to bring forward their own perspectives. The interviews ranged from 40 minutes to 1.5 hours in length. Two interviewers conducted the interviews. A female interviewer conducted the interviews with the female subjects, while a male interviewer conducted the interviews with the male subjects as it was believed that subjects may be more comfortable in discussing their exercise behavior with interviewers of the same sex. Both interviewers conducted two initial interviews together to ensure consistency in interview technique. The interviewers met privately with the subjects in various meeting rooms and offices at

the location of their employment. All interviews were tape recorded and transcribed 'verbatim'.

4.4.2 Instruments

4.4.2.1 Stages of Change for Exercise Behavior

The stages of change were assessed using Marcus, Eaton, Rossi and Harlow's (1994) Stages of Change questionnaire. Two-week, test-retest reliability with male and female employees of a medical centre was .78 (Marcus, Selby, Niaura & Rossi, 1992). Evidence for the construct validity of this measure has been presented in that it has been related to the processes of change (Marcus, Rossi, Selby, Niaura & Abrams, 1992), decision making and self-efficacy in a manner consistent with theory (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992; Marcus, Selby, Niaura & Rossi, 1992; Marcus, Eaton, Rossi & Harlow, 1994). Marcus & Simkin (1993) demonstrated the concurrent validity of this measure with the Seven-Day Physical Activity Recall Questionnaire as univariate tests revealed significant between-group differences for vigorous and moderate activity indicating that the stage of change measure is associated with another measure of physical activity. Marcus, Eaton, Rossi and Harlow (1994) suggested that a shortened version of their questionnaire could be used in future studies in order to increase the numbers of individuals able to be categorized by the measure. In this study, a shortened version of this questionnaire was designed in which individuals are presented with five statements corresponding to each of the stages of change and respondents were asked to pick a statement that best describes their current exercise behavior (Appendix L). Cardinal (1995; 1997) reported a test-retest reliability of $r=.93$ to 1.00 for this shortened version of the stage of change measure.

4.4.2.2 Enjoyment

Enjoyment of exercise was assessed using two different instruments (Appendix Q). The first is a single-item, seven-point Likert scale that was designed for this study and asked respondents to indicate how much they enjoyed exercise (not at all - a great deal). A second measure was a four-item short form of the original Physical

Activity Enjoyment Scale (PACES) developed by Kendzierski & Di Carlo (1991). This scale is comprised of the four top loading items from the original scale. Subjects are asked to rate four seven-point bipolar items. This shortened scale has been shown to have an internal consistency of $\alpha = .87$ and to correlate with the full scale ($r = .84$) (Schleppe, 1993). The internal consistency coefficient of this scale in the present study was $\alpha = .95$.

4.4.2.3 Interview Schedule

The interviews included questions assessing physical activity in one's lifestyle and the meanings of exercise, physical activity and active living, and sources of enjoyment in physical activity. A schedule of the interview questions used for this study is presented in Appendix P. To assess sources of enjoyment, individuals were asked if they enjoyed exercising or if there were any particular physical activities that they enjoyed. For each activity, individuals were asked to indicate what makes the activity enjoyable for them and were encouraged to elaborate on why these activities were enjoyable for them.

4.5 Results

4.5.1 Description of the Sample

The data utilized for this study was collected as part of a larger research project investigating involvement in physical activity. Twelve months after the overall research project began, employees of a hospital ($n = 68$) completed a questionnaire assessing exercise stage of change and level of exercise enjoyment.

Subjects in the study were also asked if they would be willing to participate in an interview. Interviews were conducted six months after the completion of the questionnaire. Although thirty two individuals initially indicated a willingness to be interviewed, eight more individuals refused to participate when contacted. Six other

individuals were unreachable at the time of interviewing, leaving an effective interview sample of eighteen individuals.

The demographic profile of the participants who completed the questionnaire and were interviewed is presented in Table 4-1. Compared to those who completed the questionnaire, individuals that were interviewed consisted of a higher percentage of full-time employees, males and paramedical technical/professionals, and a lower percentage of nurses.

**Table 4-1
Demographic Profile of Study Participants**

Demographic Variable	Questionnaire (n=68)	Interview (n=18)
Age	41.44 yrs	44.5 yrs
Gender		
Male	9 (13.6%)	5 (28%)
Female	57 (86.3%)	13 (72%)
Employed Full-time	44 (67%)	15 (83%)
Employed Part-time	14 (22%)	3 (17%)
Shifts		
<12 hour shifts	28 (41%)	2 (11%)
>12 hour shifts	12 (17%)	2 (11%)
Occupational Category		
Support (General & Clerical)	6 (9%)	3 (16%)
Paramedical	19 (29%)	7 (39%)
Technical Professional		
Nurse	32 (48%)	5 (28%)
Manager	6 (9%)	2 (11%)
Other	3 (5%)	1 (5%)

4.5.2 Enjoyment

In this study, two aspects of exercise enjoyment were examined. First, the reported levels of enjoyment of exercise from the questionnaire data were compared for individuals representing the various stages of change for exercise. Second, the sources of exercise enjoyment obtained in interviews were examined for individuals representing the various stages of change for exercise.

4.5.2.1 Levels of Enjoyment

One-way analysis of variance was utilized to examine the relationship between level of enjoyment as measured by the two enjoyment scales utilized in this study and stage of change for exercise. The results of this one-way analysis are presented in Table 4-2. Because of the small numbers in some of the stages, the stage of change categories were collapsed into an inactive stage (precontemplation and contemplation), a preparation stage, and an active stage (action and maintenance). The results of this analysis revealed that reported levels of enjoyment of exercise increased from inactive individuals to preparers to active individuals.

Table 4-2
Enjoyment Levels
Means, Standard Deviations, ANOVA and Post-Hoc Comparison Results by Stage of Change

	<i>Stage of Change</i>			F _(2,65)	p
	Inactive (n=11)	Preparation (n=24)	Active (n=31)		
PACES (5-25)	12.55 ^a (8.12)	17.41 ^b (3.09)	22.38 ^c (4.61)	15.76	<.001
Enjoyment (1-7)	2.91 ^a (1.76)	4.38 ^b (1.06)	5.48 ^c (1.41)	15.36	<.001

Similar superscripts denote stages that are not significantly different from each other at the p<.05 level as a result of Scheffe post-hoc tests. Different superscripts denote stages that are significantly different.

4.5.2.2 Sources of Enjoyment

The qualitative aspect of the study examined sources of enjoyment in exercise. Each subject was asked: (1) what physical activities they found to be enjoyable and: (2) why they were enjoyable. Many subjects made a distinction between exercise and physical activity in terms of discussing enjoyment. Exercise was viewed as activity that one was obligated to partake in for instrumental reasons and that was generally not an enjoyable thing to do. One subject commented with respect to exercise "we are doing it for a

purpose. It's not just for fun or that kind of thing. Exercise is more purposeful than physical activity". Physical activity on the other hand was viewed more broadly, linked to activities participated in everyday life that were participated in for a variety of reasons and that were enjoyable to do. According to one individual, "A bike ride or a walk or swimming I do because I enjoy. Going to the gym would definitely be because I felt I had to". Therefore, enjoyment sources were examined not just for what the participants viewed as exercise but for any physical activities that the participants found to be enjoyable.

All individuals, even those that were not currently involved in physical activity, indicated that they enjoyed some type of physical activity. When the subjects indicated an activity or activities they enjoyed, they were probed to discuss further what it was about those activities that made them enjoyable.

The interview transcripts were analyzed inductively. Patterns and themes that emerge from the data were identified. The process undertaken used the constant comparison technique (Glaser & Strauss, 1967) in which initial descriptive codes were developed to represent the experiences and ideas expressed by the subjects. Transcripts were read line by line, word by word to identify codes for sources of enjoyment identified. The transcripts were then be re-read with these initial codes in mind to examine both consistencies and inconsistencies, and to ensure that all relevant data was included. Q.S.R. NUD*IST (Non-numerical Unstructured Data Indexing Searching and Theorizing) software was utilized to facilitate this analysis. Codes were then compared to each other and organized into higher level themes.

Five major sources of enjoyment for physical activity emerged, namely, personal outcomes, intrinsic motivation, social benefits, activity sensations, and the environmental context (Table 4-3). These sources of enjoyment represent dimensions related to the experience of doing the activity or outcomes resulting from participation in the activity.

Table 4-3
Sources of Physical Activity Enjoyment

<i>Dimensions</i>	<i>Thematic Categories</i>	<i>Raw Data Categories</i>	<i>Activities</i>
Personal Outcomes	Physical Self-Improvement	<ul style="list-style-type: none"> ▪ Physical skills ▪ Physical capacity ▪ Physical appearance 	<ul style="list-style-type: none"> ▪ jogging ▪ golf ▪ walking
	Self-Esteem	<ul style="list-style-type: none"> ▪ Improved self-image ▪ Feel good ▪ Energized ▪ Feel better about oneself 	<ul style="list-style-type: none"> ▪ fitness centre ▪ walking
	Relaxation	<ul style="list-style-type: none"> ▪ Reduce stress and tension, feel relaxed 	<ul style="list-style-type: none"> ▪ walking ▪ hiking ▪ running ▪ skiing
	Sense of Accomplishment	<ul style="list-style-type: none"> ▪ Achieving goals ▪ Giving to others 	<ul style="list-style-type: none"> ▪ walking ▪ fitness centre ▪ yard work
Intrinsic Motivation	Self-Determination	<ul style="list-style-type: none"> ▪ Sense of control ▪ Doing what one wants to do 	<ul style="list-style-type: none"> ▪ walking ▪ dancing
	Competence	<ul style="list-style-type: none"> ▪ Have skills to perform activity ▪ Challenge of trying to do something well 	<ul style="list-style-type: none"> ▪ swimming ▪ skiing ▪ golfing
Social Benefits	Companionship	<ul style="list-style-type: none"> ▪ Participate with friends ▪ Participate with coworkers ▪ Participate with neighbors 	<ul style="list-style-type: none"> ▪ cycling ▪ skiing ▪ hiking ▪ skating ▪ aerobics ▪ walking
	Family Bonding	<ul style="list-style-type: none"> ▪ Spend time with family 	<ul style="list-style-type: none"> ▪ golfing ▪ swimming ▪ slowpitch ▪ running ▪ walking
Activity Sensations	Physical Sensations	<ul style="list-style-type: none"> ▪ Physical workout ▪ Being physically active 	<ul style="list-style-type: none"> ▪ fitness centre ▪ running ▪ general activity
	Perceptual Sensations	<ul style="list-style-type: none"> ▪ Speed ▪ Freedom of movement 	<ul style="list-style-type: none"> ▪ scuba diving ▪ swimming ▪ skiing
Environmental Context	Connection to Nature	<ul style="list-style-type: none"> ▪ Scenery ▪ Fresh air ▪ Sunshine ▪ Experience change of seasons ▪ Being outdoors 	<ul style="list-style-type: none"> ▪ walking ▪ cycling ▪ skiing ▪ golfing ▪ skating ▪ gardening

Personal Outcomes

Four personal outcomes were identified as important for the enjoyment of physical activity. The subjects indicated the importance of improving oneself physically in experiencing enjoyment. One subject indicated that she enjoyed activity when she could improve her physical skills – “see if you can improve yourself. Like golfing. improve your strokes or be better next time”. Another subject stated “I do reasonably well, so maintaining or trying to improve yourself in what you are doing”. Improving one’s fitness or physical capacity was also identified as being important to experience enjoyment. One subject explained her enjoyment of exercise by stating: “Sometimes when I’m doing some of the exercise, I’ve been doing the certain level for a while, and I suddenly notice this isn’t quite so hard”. Another subject indicated that it was improvements in physical appearance that made physical activity enjoyable (“makes me look good”). The relaxation resulting from participation was another factor identified as contributing to the enjoyment of physical activity. Feeling good was also identified as a factor contributing to the enjoyment of exercise. One subject stated “I enjoy it when I am doing it. I know I am going to feel good when I am finished it”. Another subject indicated that she enjoyed jogging because it improves her self-esteem – “it makes me feel good about myself, it makes me feel good about my body”. Another individual spoke of the enjoyment resulting from accomplishment – “I think when you’re done it, when you are finished, you feel good about having done it. You feel a certain amount of satisfaction that you did it”.

Intrinsic Motivation

Other factors affecting the enjoyment of physical activity related to intrinsic motivation. The importance of self-determination in the experience of enjoyment was identified. One subject stated that she enjoyed dancing “because you can express what you want to do, you’re not following the instructor”. The importance of competence was also considered important to enjoyment. In discussing why she enjoyed skiing more than

other activities. one subject stated – “I just enjoy the sport. I finally got so that I could ski without falling down too much”.

Social Benefits

The subjects in this study also indicated the importance of the social aspects of being involved in physical activity in contributing to their enjoyment. One subject stated “It’s the people and the company. I don’t participate in something with someone I don’t like”. Another stated, “Even in the gym you can exercise by your friend and still talk and what have you and that part I enjoy” and yet another stated “Socializing with the people that I do the activity with” made it enjoyable. In addition to the comraderie of socializing as being enjoyable, several subjects also indicated that they enjoy the bonding and participating as a family as being enjoyable. One subject stated she enjoyed physical activity “when I am doing things with the family, when it is exercise and I think it is a bonding thing”. Another stated, “The nice thing about going for a walk in the evenings with the dogs and my husband – gives us time after being at work all day, to be able to walk and talk and not be interrupted by kids or whatever. When the kids come with us it gives us the opportunity to talk as a family”.

Activity Sensations

Subjects also identified the sensations of doing the activity itself as important. In particular, being physical or doing a physical workout was considered enjoyable. Another sensation of the activity itself that was identified as being important for enjoyment was speed. Referring to skiing, one subject stated “I like to ski because I like the feel of going down the mountain, I like speed”. In referring to her enjoyment of swimming, another stated “you can glide through the water with such speed”. Freedom of movement was also described as an enjoyable feature of exercise. One individual commented “I like swimming because I like the water. You’re free to move in it absolutely any way you want to and you can use the water to provide resistance and

exercise your muscles. You can bend and twist uninhibited in many directions as you're suppose to in the water."

Environmental Context

Aspects of the environment in which the activity takes place were also identified as being important for enjoyment. In particular, the subjects in this study identified being outdoors in the fresh air and the scenery in the environment as leading to enjoyment. One subject stated "I enjoy being outside a lot and walking and talking, or walking and looking at the sites and nature. Whatever – just looking over the next hill is always a joy and a reward".

4.5.2.3 Stage of Change Comparisons

In order to describe how enjoyment is experienced by individuals at different stages of involvement in physical activity, comparisons were made between stage of change groups in terms of their physical activity enjoyment. Stage of change was not assessed in the interviews. Rather, as part of the larger research project of which this study was a part, stage of change was assessed at six-month intervals over the previous 18-month period prior to the interviews taking place. Individuals descriptions of their activities and intentions were found to be consistent with their stage pattern movement over the previous 18-month period. As a result, interview subjects were grouped into three categories, namely, inactive, preparer, and active, based upon their stage of change movement over the previous 18-month period, and their descriptions of their activity involvement and intentions. Although individuals were originally categorized into five stages of change (precontemplation, contemplation, preparation, action and maintenance),

three stage categories (inactive, preparers, and actives) were created in order to provide enough individuals per group to be able to make meaningful comparisons.

Individuals were categorized as inactive if they indicated being in precontemplation or contemplation in at least two of the three data collection periods. These individuals were involved in daily living activities but did not intend to do more activity nor were they thinking about doing activity in the distant future. Individuals were categorized as preparers if they indicated being in preparation in at least two of the three data collection periods. These individuals were involved in daily living activities as well as some physical activities such as swimming, walking, cycling and skating. Some of these individuals were satisfied with their current activity levels whereas others were committed to becoming more active and were making plans to do so. Individuals were classified as active if they indicated being in action or maintenance in at least two of the three data collection phases. These individuals had incorporated exercise into their lifestyle and tended to be involved in more vigorous, higher intensity activities including aerobics, running, weight training and skipping rope. The only individual that indicated being active over two of the three questionnaire data collection periods but was not classified in the active category for analysis was the individual that displayed the Contemplation-Action-Action stage movement pattern. When interviewed, this individual indicated that she had subsequently stopped taking an aerobics class that she had been involved in as the class was cancelled, but indicated that she was looking into beginning another fitness class again in the immediate future. As a result, this individual was classified into the Preparation category. The stage of change patterns of those interviewed and their categorizations are presented in Table 4-4.

Table 4-4
Subjects who Completed Interviews
Stage of Change Patterns and Frequencies

Stage of Change Pattern	Frequency
<i>Inactive</i>	<i>4</i>
Precontemplation-Precontemplation-Precontemplation	1
Precontemplation-Precontemplation-Contemplation	1
Contemplation-Contemplation-Preparation	1
Action-Contemplation-Contemplation	1
<i>Preparers</i>	<i>8</i>
Preparation-Contemplation-Preparation	3
Preparation-Preparation-Preparation	2
Preparation-Action-Preparation	1
Preparation-Maintenance-Preparation	1
Contemplation-Action-Action	1
<i>Actives</i>	<i>6</i>
Maintenance-Maintenance-Action	1
Maintenance-Preparation-Maintenance	1
Maintenance-Maintenance-Maintenance	4
<i>Total</i>	<i>18</i>

All individuals indicated enjoying at least one physical activity. Individuals in all stages of change expressed enjoyment of particular activities. As one inactive individual commented:

I wouldn't want to do aerobics. I don't think aerobics is enjoyable, unless it's that non-bounce kind. I would rather dance than exercise. I love dancing because you can express what you want to do, you're not following the instructor.

Active individuals indicated not only enjoyment of specific activities, but indicated enjoying generally being active. Active individuals also reported enjoyment as being central to their continued involvement in physical activity. As one active individual stated:

I think we are an active family, but I don't do them (referring to working out in a fitness centre, running and playing slowpitch) for exercise. I do them for enjoyment. I think I am the type of person that just can't sit. I mean, even if I am watching television. I find that it's time wasted....I guess I also want to keep being active. I dread the day when you just can't do the same things. I don't want to ever look back and think I wished I would have done that. I just want to do it all now.

Differences were found between inactive individuals and preparers and active individuals in the types of activities that were enjoyed. Inactive individuals and preparers reported enjoying less vigorous types of physical activity that were activities that were undertaken spontaneously or that were a part of everyday life. The comments of one preparer characterized these feelings:

I think of jogging as exercising but I don't think of golf or skiing as exercising...I do those because I love to do them and I think I like them both very much. I find a great deal of pleasure in them. I don't find a great deal of pleasure in jogging. I don't particularly enjoy it.

Active individuals, however, reported enjoying both daily living activity as well as activities that were considered to be exercise – vigorous, planned, and structured activities and generally being active. As one individual stated in referring to attending a fitness centre:

The club was fun. It was more like playing – you had toys to play with over there that you don't have at home. So it's fun to be on those things and make them do your will. But it's still exercise and if you're at home and you are pulling out a skipping rope or doing something like walking where you don't need any special equipment for it, it's still exercise. It's still as much fun, it's just different.

Each time an individual mentioned one of these sources of enjoyment in their interview it was counted as a frequency. The frequencies in which individuals mentioned the various sources of enjoyment were then compared across the stages of change. These frequencies are reported in Table 4-5. Chi square analysis revealed that the differences between the stage of change groups was not significant ($\chi^2=12.24$, $p>.05$).

Table 4-5
Sources of Physical Activity Enjoyment
Frequencies across the Stages of Change

Enjoyment Source	Stage of Change			Total
	Inactive (n=4)	Preparer (n=8)	Active (n=6)	
Personal Outcomes	4	2	11	17
▪ Self-Improvement	-	1	3	4
▪ Self-Esteem	2	-	2	4
▪ Relaxation	2	-	3	5
▪ Sense of Accomplishment	-	1	3	4
Motivation	1	4	1	6
▪ Self-Determination	1	1	1	3
▪ Competence	-	3	-	3
Social Benefits	1	4	8	13
▪ Companionship	1	4	6	11
▪ Family Bonding	-	-	2	2
Activity	1	3	3	7
▪ Physical Sensations	-	3	1	4
▪ Perceptual Sensations	1	-	2	3
Environmental Context	6	6	7	19
▪ Connecting to Nature	6	6	7	19

Although differences were not found to be statistically significant, some trends may be noted. Inactive individuals and preparers indicated different sources of their physical activity enjoyment than active individuals. Active individuals reported social aspects of the activity and personal outcomes derived from the activity as more central to their enjoyment of physical activity. Inactive individuals and preparers, on the other

hand, generally focused on aspects surrounding the experience, in particular the environmental context.

4.6 Discussion

This exploratory study provided information about enjoyment levels and sources of physical activity enjoyment for individuals at different stages of involvement in physical activity. Levels of enjoyment were assessed and sources of enjoyment in a variety of physical activity contexts were identified. In general, the results of this study provide evidence to indicate that levels of enjoyment are related to different stages of change for exercise, and that the sources of enjoyment in physical activity contexts are diverse.

The results of this study suggest that active individuals experience greater levels of enjoyment than inactive individuals or preparers. All individuals were found to indicate that they enjoyed some type of physical activity suggesting that enjoyment alone is not sufficient to facilitate involvement in physical activity as inactive individuals indicated enjoying certain activities as did active individuals. Active individuals, however, indicated greater levels of enjoyment for exercise, indicated enjoying more vigorous types of physical activities and also indicated enjoying not only just specific activities, but generally leading an active lifestyle. Active individuals indicated that they valued and enjoyed an active lifestyle and enjoyed receiving the benefits derived from participation. These findings indicate that enjoyment is an important determinant of participation in physical activity, supporting the suggestion made by researchers that enjoyment is an important variable associated with participation in exercise and that it is particularly important for continued involvement in physical activity (Heck & Kimiecik, 1993; Wankel, 1993).

The findings of this study with respect to the sources of enjoyment replicate many of the sources of enjoyment identified by Heck and Kimiecik (1993) with adult exercisers. This study was conducted with individuals representing different stages of change for physical activity involvement and participation in a variety of activities,

including but not limited to structured exercise opportunities, whereas Heck and Kimiecik (1993) studied individuals who were regularly active in structured fitness settings. This suggests that the sources of enjoyment in physical activity contexts are similar across different types of activities. Both studies identified the importance of social support, personal physical and psychological outcomes, intrinsic motivation and connecting to nature as being important for the enjoyment of physical activity.

One difference in findings with respect to sources of enjoyment arose between the study conducted by Heck and Kimiecik (1993) and the present study. Heck and Kimiecik (1993) reported experiencing competition with oneself or others as important for the group of exercise maintainers that they studied. This source of enjoyment was not mentioned in the present study. This could be due to the nature of activities discussed in that one of the activities for participants in the study by Heck and Kimiecik (1993) was structured aerobic games (floor hockey, basketball, ultimate frisbee) in which competition is part of the activity structure. Activities that individuals referred to in the present study did not generally include structured sports. Another source of enjoyment that was identified in this study but not by Heck and Kimiecik (1993) included aspects of the activity itself including a variety of physical and perceptual sensations that result when participating (experiencing speed, freedom of movement, being physical). Again, this difference could be due to differences in activities referred to in discussing enjoyment. Individuals in the present study discussed a variety of physical activities, such as skating, skiing, and swimming, that may be more likely to provide opportunities to experience these sensations than structured fitness programs.

The findings of the present study is also consistent with studies of enjoyment in youth sport that have identified intrinsic, social and extrinsic factors as being important for the experience of sport enjoyment (Scanlan & Simmons, 1992). These findings suggest that a variety of factors lead to the experience of enjoyment in physical activity contexts. These factors include intrinsic motivation but also include factors that cannot be subsumed under the concept of intrinsic motivation. Thus, although intrinsic motivation and flow are part of the enjoyment experience in physical activity contexts, these concepts do not account for all sources of enjoyment in physical activity. When

individuals speak of enjoyment of physical activity, they speak not only of the positive affect that accompanies intrinsically motivated experiences, but refer to positive feelings that are created by a diverse range of factors surrounding the experience that are attractive to them (socializing, natural environment, physical and perceptual sensations) as well as the outcomes that they like to experience and feel a sense of satisfaction in achieving (relaxation, physical self-improvement, improved self-esteem). This suggests that enjoyment of physical activity experiences occurs not only during the activity itself, but also in achieving outcomes that result after participation has occurred.

It has been suggested that the concept of enjoyment is not very well understood, that there is ambiguity in its definition, and that a better understanding of the concept is required in order to use it in explaining physical activity experiences (Kimićek & Harris, 1996). Kimiecik and Harris (1996) in providing a conceptual/definitional analysis of enjoyment for sport and exercise psychology propose a working definition of enjoyment in sport and exercise research as "an optimal psychological state (i.e. flow) that leads to performing an activity for its own sake and is associated with positive feeling states" (p.256). They suggest that enjoyment is an optimal experience and that "an enjoyable activity is one that is done not with the expectation of some future benefit, but simply because the doing itself is the reward" (p.256). Clearly the findings of the present study do not support this definition of enjoyment as individuals discussed a variety of sources of enjoyment beyond those resulting from optimal experiences. Although individuals did not define "enjoyment" as part of this study, they were able to understand what was meant when they were asked if they enjoyed physical activity and were able to indicate the factors that made physical activity enjoyable for them. When they discussed enjoyment, their accounts went beyond an optimal psychological state and referred to positive feelings that resulted from a variety of other factors.

The findings of this study support the definition of enjoyment proposed by Wankel (1993) as "a positive emotion, a positive affective state" (p.153) that is accompanied by specific cognitions that may vary across individuals or across situations for the same individual (Wankel, 1997, p.103). Defining how this positive feeling is similar to or differs from other positive feelings, and whether this positive affect is

experienced differently based upon the perceptions associated with it is a challenge for future research on exercise enjoyment to provide further clarity of the concept under investigation. Theoretical work on intrinsic motivation suggests that the enjoyment derived from intrinsic motivation that involves perceptions of self-determination and competence may be experienced more intensely and may be of a different nature than the enjoyment experienced from external factors such as experiencing the health benefits of activity or experiencing a connection to nature.

Deci and Ryan suggest that as behaviors become more internalized and self-determined, the experience of enjoyment increases. Csikszentmihalyi (Csikszentmihalyi & Kleiber, 1991) makes a distinction between enjoyment and pleasure, with enjoyment being experienced when one is using their skills and requires gradual increases in challenges and skills to avoid boredom and anxiety, while pleasure is experienced in the satisfaction of homeostatic needs involving activities that do not require complex skills and that can be repeated over and over and still be pleasurable. Enjoyment is seen as increasing motivation to seek further challenges and thus is growth-oriented promoting skill development, whereas pleasure is experienced when a need is satisfied. Further research and theoretical development is needed to reconcile these differences in the theoretical work on intrinsic motivation and enjoyment and the findings of empirical research that demonstrate that individuals do not make these distinctions in discussing their enjoyment in physical activity contexts and discuss a number of factors beyond self-determination and competence as being sources of their enjoyment of physical activity.

This study not only identified sources of enjoyment, but examined the differences in sources of enjoyment for individuals representing various stages of involvement in physical activity. The environmental context, and in particular connecting to nature, was found to be a source of enjoyment for individuals at all stages of involvement in physical activity. Active individuals, however, tended to indicate the importance of personal outcomes and social benefits as important factors for their enjoyment of physical activity to a greater extent than did less active individuals. This suggests that for long-term involvement in activity, experiencing the personal outcomes resulting from participation and social interaction as part of the experience are important motivational aspects that

lead to enjoyment of the physical activity experience which in turn may reinforce continued participation. It suggests that to facilitate involvement by less active individuals, physical activity environments need to, beyond providing opportunities to connect with nature, be structured so as to encourage positive social support and interaction as part of the experience and to facilitate individuals' experience of a variety of short-term and longer-term physical, emotional and psychological benefits.

There exist a number of limitations that should be considered when interpreting the results of this study. The generalizability of the findings may be limited due to low sample sizes and the worksite population studied. Different studies need to be undertaken with different populations to provide further support of the generalizability of the findings. Due to small sample sizes, the stages of change were collapsed in order to obtain meaningful comparisons and to run statistical analyses. Therefore, differences between the precontemplation and contemplation stages, and the action and maintenance stages were not examined. Future research with larger sample sizes representing all five stages of change is required to further our understanding of sources of enjoyment between the stages of change.

4.6.1 Implications for Practice

The results of this study indicate that enjoyment is a factor associated with participation in physical activity. Therefore, facilitating enjoyment of physical activity is an important consideration for practitioners.

In examining sources of enjoyment in physical activity contexts, this study provided further evidence as to the factors that practitioners need to address in facilitating enjoyable experiences. In particular, this study emphasized the importance of individuals experiencing a variety of physical and psychological benefits and experiences, providing opportunities for individuals to interact socially, allowing individuals to experience a connection to nature, and facilitating perceptions of competence and self-determination as important for the enjoyment of physical activity.

These results indicate that it is important for practitioners to recognize the diverse benefits of physical activity experiences that individuals identify as enjoyable, including both physical and psychological benefits. Promoting social interaction, allowing time for individuals to interact socially either during, before or after physical activity experiences, and designing experiencing to include social interaction components are important to facilitate enjoyment. Many individuals indicated the enjoyment of nature, therefore designing facilities with windows so that individuals can see nature, including plants inside facilities, and incorporating activity outdoors are some strategies that may be useful to facilitate enjoyment in physical activity. Designing experiences to include a variety of skill levels and fitness levels will assist individuals in experiencing perceptions of competence in the performance of physical activity. Encouraging individuals to participate at their own level may also assist in promoting perceptions of competence. Self-determined participation may be facilitated in several ways. Individuals can be encouraged to participate in activities that they desire to do because of their inherent enjoyment and interest to the individual. Participation based upon intrinsic motivation is self-determined by nature. Practitioners should limit evaluations, material rewards, threats of punishment, deadlines and imposed goals as they have been found to be experienced as controlling, whereas acknowledging feelings and providing choice have been found to be supportive of self-determined participation and thus should be used by practitioners (Deci & Ryan, 1994).

4.6.2 Summary

Enjoyment was found to be a determinant of physical activity participation, with levels of enjoyment increasing across the stages of change. Although enjoyment levels differ, further research is required in order to understand and clarify the manner in which enjoyment influences participation in physical activity. Enjoyment could influence physical activity participation in several ways including providing a motive for participation as well as acting as a reward for participation.

The results of this study suggest that a variety of sources of enjoyment in physical activity contexts exist. Further research is needed on the sources of enjoyment across a variety of population groups and physical activity experiences to generalize the findings of this study. The development of strategies to make physical activity participation more enjoyable will be facilitated by identifying sources of enjoyment across settings and population groups.

The results of this study were consistent with research in youth sport contexts (Scanlan & Simmons, 1992) indicating that the sources of enjoyment are both extrinsic and intrinsic to the activity itself. Further research and theoretical work is needed to reconcile the empirical findings that sources of enjoyment in physical activity contexts include, but cannot be subsumed under the concept of intrinsic motivation. Within the motivation literature, enjoyment is often related with intrinsic motivation and is often viewed as a measure of intrinsic motivation. The results of this study indicate that enjoyment is derived not solely from intrinsic motivation. In order to more fully understand how to facilitate enjoyment of physical activity, theories extending beyond those found in the intrinsic motivation literature are needed to explain how enjoyment influences participation and is derived in physical activity contexts.

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CHAPTER 5

Conclusion

5.1 Summary

This study attempted to bridge research in motivation, behavior change and exercise psychology to provide a better understanding of exercise behavior. It sought to assess the applicability of the Transtheoretical Model to exercise. It also addressed some of the limitations of applying this model to the study of physical activity behavior. This study investigated a variety of facilitators and barriers to involvement in exercise that are not included in the model. As well, it included a health-behavior change perspective of exercise participation, but also considered the role of enjoyment in facilitating involvement in exercise. By utilizing both quantitative and qualitative methods, it attempted to identify factors associated with physical activity involvement as well as to explain the context in which they are experienced to gain additional insight into participation in physical activity.

Many researchers and practitioners are interested in utilizing the Transtheoretical Model in studying and changing exercise behavior. One purpose of the present study was to investigate in greater depth the applicability of this model to exercise. This current research project attempted to extend upon previous research by utilizing a twelve-month longitudinal design and to clarify discrepancies in research undertaken to date in applying this model to exercise to provide further evidence for the generalizability of the model. This research project provided partial support for the application of the Transtheoretical Model to exercise. In general, support was found for the stage of change, decision-making and self-efficacy constructs of the model and some support was found for the processes of change construct. Use of only five processes were found to consistently differ between inactives, preparers, and actives in cross-sectional analysis and longitudinal analysis indicated some support for the model.

In addition, the qualitative aspects of this study provided an opportunity to assess the applicability of the stage of change construct to exercise. Initial research in smoking cessation (Prochaska & DiClemente, 1982) identified the stages of change through conducting interviews about smoking cessation. As identified by Prochaska and colleagues, participants in this study did indicate differences in quality of intentions that could be categorized into three types of intentions: the presence of no intention to be active; the presence of an intention to be active at some time in the future but with no specific plans being made; and the presence of a commitment to follow-through on an intention in the immediate future with specific plans being made.

Contrary to addressing smoking cessation, which is a discrete behavior, the findings of this study emphasized the challenge of defining and assessing the behavior in question – physical activity. Physical activity is a diffuse and complex behavior involving different types of activities of varying intensities, durations, and frequencies. In addition, the behavior in question may be addressed by different labels including exercise, physical activity and active living. The results of this research indicated that individuals had different connotations for different labels of the behavior and also considered the purpose of the behavior and motives for participating in the behavior as important factors in defining the behavior itself. This indicates that one of the challenges of applying the stage of change construct to exercise is in the measurement and definition of the behavior itself which will likely vary depending upon the purpose for which the measurement is being used.

Another purpose of the present research project was to examine similarities and differences in barriers and facilitators to physical activity involvement across the stages of change. The findings of this study provide support to the conclusion made by Sallis & Owen (1997) in their review of the literature on determinants of physical activity. They state “no single variable or category explains most adult physical activity or exercise. Different variables are most likely strong influences for different people, and the strengths of influences for each person may vary at different stages of change and developmental periods” (p.114). This inductive study found that determinants included

personal, situational and environmental variables and the determinants varied at different stages of change.

The most commonly expressed barriers to becoming involved in regular, vigorous activity by inactives and preparers were situational/environmental in nature. In particular, lack of time was the most frequently cited barrier. Lack of time, however, was found to be an indication of not considering activity as a priority. In addition, inactives tended to focus on personal reasons, such as lack of motivation, lack of energy and stress, for not being active. Inactives and preparers tended to focus on situational/environmental factors, in particular having more time, as potentially facilitating their involvement.

Some inactives and preparers viewed their activity levels as sufficient and did not intend to do more activity. These individuals resisted change, denied their need for more activity, and rationalized their current behaviors. Other inactives and preparers were not content with their current activity levels and intended to do more. Differences were found in levels of commitment to intentions. Some individuals displayed characteristics of contemplators in that they wanted to become more active sometime but were still ambivalent about doing so. These individuals focused on the barriers preventing their participation. Others displayed characteristics of individuals in preparation to become more active, intending to do so in the near future and making plans to increase their activity levels. These individuals were focused upon identifying solutions to overcome barriers. The motives of inactives and preparers to become more active were not intrinsic, but rather coerced by internal or external factors. They viewed their potential increased participation as something they should be doing for the health benefits, or something they would do if they were forced to by an external event (e.g. a health problem).

Active individuals, on the other hand, placed a higher personal value on the importance of being active, indicated desiring to be active and enjoying activity and its outcomes, and viewed the physical and psychological outcomes derived from participation as important facilitators to their involvement. They had integrated activity into their daily life and perceived physical activity as being part of their daily routine therefore activity barriers were not an issue for them.

One concern of the application of the Transtheoretical Model as applied to exercise is the validity of the use of the processes of change. The processes of change were identified in reviewing psychological theories and initially as applied to the study of smoking cessation (Prochaska, 1979; Prochaska & DiClemente, 1983). The processes of change were initially identified in the area of smoking cessation through retrospective interviews with individuals who had quit smoking (Prochaska & DiClemente, 1983). The present study also utilized retrospective interviews in examining exercise behavior change. The examination of barriers and facilitators in the present study provides support for the use of many processes of change in exercise.

The differences in barriers and facilitators across the stages of change, in general, support one of the propositions of the Transtheoretical Model that experiential processes are important in the earlier stages of change while the behavior processes become more important in the action and maintenance stages. In examining barriers and facilitators, the present study found that psychological factors were identified as important by those in precontemplation and contemplation, while situational and environmental factors were identified as important for those in preparation, action and maintenance.

Use of several processes of change in particular, that were identified by Prochaska (1979), was also supported through the retrospective interviews examining barriers and facilitators to exercise involvement. Individuals identified use of social support, or the process of helping relationships in assisting them to be active. Individuals also discussed the process of social liberation by identifying environmental supports, such as more time, convenient access to facilities and low cost opportunities, as important factors for their participation in exercise. Support was also found for the process of contingency management as individuals discussed positive psychological and physical outcomes as facilitating their involvement. The process of stimulus control was also discussed as features of the activity itself and using prompts and reminders were influential in facilitating physical activity participation. Individuals also identified self liberation as an important process as being motivated and making physical activity a habit was considered as a facilitators, whereas lack of motivation was considered a barrier. Individuals also discussed factors related to the process of self reevaluation in that factors

related to one's self-identity, such as experiencing relatedness to one's values and experiencing self-acceptance from participation, were also considered important for involvement in exercise.

Another aspect of this research project was to examine the role of enjoyment in physical activity participation. Enjoyment is one motive for participation that has been suggested as being particularly important for continued, ongoing participation in physical activity (Wankel, 1985). This was supported by the current research as levels of enjoyment were found to increase across the stages of change from inactive individuals, to preparers, to active individuals. As enjoyment is a determinant for physical activity participation, sources of physical activity enjoyment were examined in an attempt to identify strategies to make physical activity participation more enjoyable. Several sources of enjoyment were identified. The environmental context, and in particular connecting to nature, was found to be an important source of enjoyment for inactive individuals, preparers and active individuals. The personal physical and psychological outcomes from involvement, intrinsic motivation, perceptual sensations, and social support were also found to be important sources of enjoyment, particularly for active individuals. These results indicated that contrary to much of the theoretical work on enjoyment within the motivation literature, enjoyment is experienced from more than what can be subsumed under the concept of intrinsic motivation.

Overall, the results of this research project indicate that participation in physical activity involves health as a motive, but also involves other motives as well, such as enjoyment. Health may be a primary motive for beginning physical activity participation, but other factors such as enjoyment are important for continued participation. Results of this research also provide further evidence that involvement in physical activity is influenced by a broad spectrum of determinants including individual, situational and environmental factors. Therefore, application of models such as the Transtheoretical Model, that are derived from studies of health behavior and consider only individual determinants, although important, are limited in explaining physical activity involvement.

5.2 Summary of Study Limitations

There exist a number of limitations in this study that should be considered when interpreting the results and in designing future studies. Further research with larger samples and more diverse population groups is required to clarify discrepancies in findings in use of the processes of change both cross-sectionally and longitudinally. The results of this study are limited in that a diminished sample of the same subjects was utilized in all three quantitative assessments. Therefore, the cross-sectional analysis at each phase was conducted with the same individuals limiting the generalizability of the findings. Further research needs to be undertaken investigating the processes and stages of change with different populations to provide further support of the generalizability of the model to exercise.

In addition, very small sample sizes were utilized due to subject attrition. Due to this attrition and a desire to compare results across studies, the stages of change were collapsed into three groups for analysis. Therefore differences between the precontemplation and contemplation stages, and the action and maintenance stages were not examined. Future research with larger sample sizes representing all five stages of change is required to more fully examine the Transtheoretical Model and differences in determinants across the stages of change.

This study only assessed stages and processes of change over time in examining the longitudinal aspect of the Transtheoretical Model. To gain a more complete understanding as to whether changes in determinants over time is associated with movement through the stages, more longitudinal research is required that assesses all constructs (e.g., decision making, self-efficacy) over time in order to gain a better understanding of the temporal dimension of behavior change.

5.3 Implications for Researchers

Based upon the results of this research, several recommendations for future research may be made.

The results of this study were based solely on self-report data therefore error in memory, recall or biased responding may have influenced the subjects' responses. In

particular, the results of this study indicate that revisions are required for the stage of change measure used in this study. Individuals were found to display characteristics of the stages of change identified by Prochaska and colleagues. Characteristic of the precontemplation stage, individuals in this study demonstrated resistance to change and rationalizations of their current behaviors. Individuals were also found to display characteristics of contemplators, intending to increase activity sometime in the future but still ambivalent towards change. Individuals also displayed characteristics of the preparation stage, intending to increase their activity in the near future and making plans to do so. The stage of change measure utilized in this study, however, may not have properly categorized individuals. Specifically, the item utilized in this study to measure preparation (“I currently exercise some but not regularly”) does not take into account whether individuals intend to do more activity or not and does not necessarily reflect preparatory actions taken for exercise. The item which classifies individuals in preparation needs to be reworded to include a measure of intention and to expand the types of preparatory actions that are typically undertaken for physical activity participation (searching for opportunities to be active, looking for someone to participate with etc.) in order to more accurately measure the preparation stage of change for exercise.

Another challenge of the stage of change measure used in this study is in defining the behavior and establishing the criterion required. Unlike other discrete behaviors (e.g. smoking), physical activity is a continuous variable, whereby every individual participates in some physical activity as part of daily life. It is the degree of participation that varies. However, individuals in this study also discriminated between definitions of physical activity and exercise, thereby indicating that not only are levels of the behavior important, but individuals’ definitions of the behavior in question are also important in self-report assessment of activity levels. Individuals viewed different behaviors as being qualitatively different from each other, based upon the purpose and structure of the activity. The results of this study indicated that to improve the assessment of the stage of change for exercise, not only should the type, intensity, duration and frequency of activity be included, but the activity of interest, including the

purpose or motives for participation, needs to be defined as specifically as possible to provide further clarity as to the behavior being assessed. In addition, accompanying the measure with self-monitoring of activity and objective measures of activity will assist in providing further accuracy in categorizing individuals into the appropriate stages of change. In utilizing this stage of change measure for future research, the definition of the behavior in question and the criterion established for this stage of change measure will likely differ based upon the purpose of the research. This highlights the challenge of the application of the stage of change construct to physical activity. Establishing an activity adoption criterion is a challenge as physical activity participation is such a diffuse behavior and activity criteria may differ for different research purposes. As a result, assessment of activity levels and defining the adoption of activity behavior will continue to be a challenge for researchers.

In terms of the processes of change, some support for the Transtheoretical Model was demonstrated in this study. The cross-sectional analysis of the present study generally supported previous cross-sectional research investigating the relationship between the stages of change and the processes of change (Gorely & Gordon, 1995; Marcus, Rossi et al., 1992) in which there was a general trend for use of the processes of change to increase from those who were inactive to preparers to those who were active. In the present study, the strongest support was found for the use of the behavioral processes of change as four of the five behavioral processes were found to be used more frequently from contemplation to preparation to action across three replication studies.

One of the strengths of the present study in examining the applicability of the Transtheoretical Model to exercise is the methods utilized. By using both a longitudinal, repeated-measures design as well as qualitative methodology, this study was able to extend upon previous research by examining changes in stage movement and process use over a twelve month period and to examine behavior change for exercise from the participant's point of view. The findings of this research emphasize the importance of considering methodology in assessing the applicability of the Transtheoretical Model to exercise. In examining the survey data cross-sectionally, as has been done in much of the research examining the applicability of the Transtheoretical Model to exercise, the

findings of this study were generally consistent with previous research. However, the results from the present study emanating from the examination of changes over time through a longitudinal design and through qualitative methods demonstrated little consistency with the behavior change process hypothesized by the Transtheoretical Model. The longitudinal examination of the relationship between the stages of change and the processes of change indicated that, contrary to what was expected, changes in process use were not found to be associated with movement between the stages of change. Through the qualitative methodology employed, it was found that individuals, in discussing their behavior and changes in their behavior over time, did not discuss their exercise in terms of meeting a particular criterion of participation that reflected the adoption of the behavior, or expressed a differentiation between the adoption and maintenance of the behavior, but rather referred to specific and diverse activities that they currently participated in, wanted to participate in at sometime in the near or distant future, or used to participate in at some time in the past when referring to their exercise behavior. These differences in findings based upon different methods suggest that the Transtheoretical Model is useful to describe consistencies of patterns across large groups of individuals, but that it may not be as useful in examining exercise behavior change over time at the individual level.

In terms of the processes of change scale, many participants indicated that some processes of change scale items were difficult to interpret and irrelevant, in particular the dramatic relief items (e.g. "dramatic portrayals of the evils of inactivity move me emotionally"). This is consistent with what was reported by Gorely and Gordon (1995), suggesting that the content of some scale items be reexamined for future research.

As well, the findings of this study do not necessarily provide support for the stage of change construct. This study did demonstrate that in examining movement between stages over time that individuals were more likely to move to adjacent stages. In addition, differences in determinants were found between the stages of change. These findings may also be found if stage-like categories, or pseudostages, are created out of a continuum. Movement to adjacent stages is also consistent with a pseudostage model as one would expect small changes along a continuum to be more common than large

changes. As well, changes in determinants across stages may indicate a nonlinear relationship between these variables and an underlying continuum (Kraft, Reynolds & McCreath, 1999; Weinstein, Rothman & Sutton, 1998). Therefore, although the relationships between determinants and stages, and the descriptions of stage movement over time in this study are informative, they do not necessarily prove or disprove the existence of stages of change for exercise.

The results of this study were consistent with other research on the determinants of physical activity involvement in that individual, situational and environmental factors were identified as influencing participation in physical activity. Further research is needed on the determinants of physical activity that utilizes theories and models that hypothesize behavior as being influenced by intrapersonal, social and physical environmental variables. Use of these theories and models will assist in further identifying the variables, from the broad spectrum of potential determinants, that are the most highly related to physical activity participation. Social Cognitive Theory (Bandura, 1986), that addresses interactions between intrapersonal, social and physical environmental factors and ecological models (Sallis & Owen, 1997; Stokols, 1992), which address social and physical environments but that also assume multiple levels of influence on behavior, may be particularly useful. By incorporating theories and models with a broader focus into determinants research, it will assist in not only identifying the most salient influences, but use of theories will assist in providing descriptions as well as explanations of research findings.

The results of this study also indicated the existence of differences in determinants of physical activity across the stages of change. This suggests that continued research that utilizes stages of change to examine associations with determinants may be useful in identifying the variables that are critical for movement from one stage to another. The results of this study suggest that a more complete understanding of physical activity participation will be gained through research that incorporates personal, situational and environmental factors that may influence different levels of involvement in physical activity.

The results of this study also suggest that more research is needed to gain a better understanding of the nature and role of enjoyment in influencing physical activity participation. The results of this study support the definition of enjoyment as "a positive affective response to the experience that reflects generalized feelings such as pleasure, liking and fun" (Scanlan & Simmons, 1992, p.201). An affect has been defined as "mental states involving evaluative feelings – psychological conditions when the person feels good or bad, and either likes or dislikes what is happening (Parkinson, Totterdell, Briner & Reynolds, 1994, p.4). The category of affect includes a wide variety of phenomena including moods and emotions. Individuals appear to understand what is meant when they are asked about enjoyment of physical activity and asked to discuss enjoyment in terms of a positive feeling toward aspects of the physical activity experience. However, the concept of enjoyment may require more precise and specific definition and conceptual clarity beyond "positive affect" in order to understand the concept that individuals are referring to when addressing enjoyment of physical activity contexts, and to ensure that individuals are referring to the same affective experience when referring to enjoyment.

Most of the research attempting to uncover the basic dimensions that account for differences between affective states has not identified enjoyment as one of these affective states. Comparisons of facial expressions, introspective analysis of experience, investigation of word meanings, and analysis of consistencies in self-reports of affect between people have been utilized to identify the basic common dimensions of affective experience and to map the structure of affect based upon these dimensions. Common dimensions identified have been positive or negative affect, pleasant-unpleasant and high activation-low activation. A number of positive affective states have been identified along the pleasant-unpleasant dimension, with ranging levels of activation (e.g. excitement, delight, happiness, pleasure, gladness, contentment). How enjoyment is related to these concepts is yet to be determined. It has also been suggested that differences between the qualities of affective states depend on more than these dimensions and that additional factors such as levels of control, depth of experience and locus of causation influence affective meaning (Parkinson et al., 1996). Parkinson and

colleagues suggest that in assessing affective states they may be defined partly according to their dimensions and partly according to the causes and consequences of what is felt. Parkinson and colleagues suggest that differences in fundamental intrinsic qualities of affect is not reducible to degree of pleasantness and activation but that they are also affected by “dimensions such as control and locus of causation (that) depend on interpretations of the psychological situation surrounding the affect rather than the feeling itself” (Parkinson et al., 1996, p.39). Therefore, in developing a working definition of enjoyment for the purpose of studying physical activity enjoyment, future research is needed to attempt to identify the specific qualities that distinguish enjoyment from other positive affective states and in so doing may lead to further conceptual development and clarity of the concept. The results of this study indicated that a variety of factors were identified as sources of enjoyment. Future research in clarifying the construct is also needed to investigate whether the nature of the affective state experienced differs based upon the perceived source of enjoyment.

The results of this study indicated that enjoyment is a determinant of physical activity participation. Further research is needed to explain the manner in which enjoyment influences participation in physical activity. Enjoyment could influence participation in a variety of ways including providing a motive for participation or providing the expectation of experiencing enjoyment from participation in anticipation of the experience, and the actual experience of enjoyment participation itself or the experience of enjoyment resulting from the outcomes derived from activity may reward and reinforce participation. Further clarification of the way in which enjoyment influences participation will provide greater understanding of enjoyment as a determinant of physical activity involvement. Further research is needed on the sources of enjoyment across a variety of population groups and physical activity experiences to generalize the findings of this study. Identifying and determining the importance of sources of enjoyment will lead to the development of strategies to make physical activity participation more enjoyable. In addition, further theoretical work is needed to account for the manner in which enjoyment influences participation and the diversity of factors influencing enjoyment in physical activity contexts. The results of this study were

consistent with results found in youth sport studies indicating that a distinction needs to be made between enjoyment and intrinsic motivation (Scanlan & Simons, 1992). Within the motivation literature, enjoyment is often equated with intrinsic motivation and is often viewed as a measure of intrinsic motivation. The results of this study indicated that enjoyment is derived not solely from intrinsic motivation, but from a variety of factors within the physical activity experience. In order to more fully understand how to facilitate enjoyment of physical activity, theories extending beyond those found in the intrinsic motivation literature are needed to explain how enjoyment influences participation and is derived in physical activity contexts.

5.4 Implications for Practitioners

Studies investigating the determinants of physical activity, such as the present study, assist in identifying attributes of individuals and the social and physical environmental context that may influence physical activity participation. It is assumed that by identifying variables that are associated with activity, changing these variables may lead to changes in behavior. Therefore, identification of these variables may assist in developing and guiding content of interventions to facilitate involvement in physical activity and targeting interventions for particular groups to improve their effectiveness. Based upon the findings of this study, the following recommendations may be made in order to assist practitioners to facilitate involvement in physical activity.

The results of this research indicated that determinants differed across the stages of change. Therefore, stage of change may be one concept utilized to assist practitioners in determining the appropriate targets for interventions. The results of this study do indicate, however, that assessment of exercise stage of change requires further refinement for both research and applied purposes. Currently, a stage of change assessment questionnaire similar to the one utilized in this study is being provided to physical activity practitioners in training/certification programs (Canadian Society for Exercise Physiology, 1996). Results of this study indicate that further refinement of this questionnaire is desirable to assist practitioners in better assessment of stage of change. Particular attention needs to be paid to defining the activity criterion and the definition of

the behavior in question so that the behavior and criterion are defined as specifically as possible for the purpose of the assessment. In addition, the preparation item needs to be refined to include a measure of intention and to expand upon the actions taken in preparation for physical activity participation.

The results of this study provide suggestions as to the factors to be targeted through interventions to facilitate movement through the stages of change. Practitioners involved in facilitating physical activity need to address all levels of factors that influence participation in physical activity. The results of this study indicated that individual, situational and environmental factors were associated with physical activity participation. Therefore, there is a need for a variety of interventions that target this diversity of factors to provide supportive environments and social contexts and to facilitate individual behavior change. Based upon the results of this study, a number of specific suggestions may be made to assist practitioners in facilitating involvement in physical activity.

The most commonly cited barrier for those who are inactive (precontemplators, contemplators and preparers) is lack of time. Inactive individuals indicated that they did not have time to be active largely due to work or family demands. Interventions targeting supportive environments such as providing reasonable work loads, work hours, and child and older adult care services will assist in reducing structural constraints upon individuals' free time. Lack of time, however, was largely found to be a reflection of activity priorities in the present study. All individuals in this study, both active and inactive, were found to be experiencing similar work and family situations. Active individuals did not indicate having more time as a facilitator for their involvement but rather valued physical activity and were able to integrate it into their daily lives. Therefore, in order to assist individuals to develop the intention to be active and commitment to that intention, practitioners need to address individuals' activity priorities and assist them in examining their values and perceiving physical activity as a greater priority in their lives.

Practitioners need to assist individuals in identifying their rationalizations and defenses. In particular with the defense of "lack of time", research in the field of leisure studies has indicated that most individuals perceive that they have less free time than they

actually have. Perceptions of free time have been found to change by having individuals complete time use diaries in which they self-monitor their use of time. Generally, perceptions of amount of free time tend to increase once time use diaries are completed (Robinson & Godbey, 1997).

Several techniques may be useful to assist individuals in perceiving physical activity as a priority in their lives. Individuals need to gain awareness that their sedentary lifestyles are a problem. This can be accomplished by providing individuals with health-risk information associated with a sedentary lifestyle. As well, the decision balance sheet may be a useful tool to assist individuals in assessing the gains and losses they anticipate from physical activity participation. Through use of this tool, individuals will begin to become aware of their values and how physical activity can support their values, and also to develop strategies to minimize perceived negative consequences of involvement in physical activity. This technique assists individuals in increasing the perceived pros of participating in physical activity and decreasing the perceived cons and thus may assist individuals in developing the perception that physical activity is a priority in their life.

This study indicated that active individuals were self-determined in their physical activity participation as they valued and integrated physical activity into their daily lives whereas less active and inactive individuals did not value physical activity and perceived that their participation was coerced. Facilitating intrinsically motivated and self-determined participation will assist individuals in internalizing the value of physical activity and integrating it as part of their life. Self-determined participation may be facilitated in several ways. Individuals can be encouraged to participate in activities that they desire to do because of their inherent enjoyment and interest to the individual. Participation based upon intrinsic motivation is by nature self-determined. Physical activity contexts, however, need to be designed so as to not undermine intrinsically motivated behavior. Research examining social-contextual influences on intrinsic motivation (Deci & Ryan, 1994) has demonstrated that events which are experienced as controlling, pressured, or coerced undermine intrinsic motivation whereas events that are experienced as autonomy supportive, encouraging self-initiation and choice, and support

perceptions of competence, maintain or enhance intrinsic motivation. Evaluations, material rewards, threats of punishment, deadlines, and imposed goals have been found to be experienced as controlling, whereas acknowledging feelings and providing choice tend to be experienced as autonomy supportive. The way in which these events are administered also influences their effects. Language that utilizes pressuring phrases such as "you should" or "you have to" undermines intrinsic motivation. Positive feedback that strengthens perceived competence and is informational and delivered in a noncontrolling style enhances intrinsic motivation. Perceived competence can also be strengthened, and intrinsic motivation enhanced, by providing activities that optimally challenge individuals. Although intrinsically motivated behaviors are considered self-determined by nature, extrinsically motivated behaviors are considered to vary in the degree to which they are self-determined (Deci & Ryan, 1985). It has been suggested that the processes of integrating and internalizing extrinsic motivation to become more self-determined are facilitated by providing a meaningful rationale to assist the individual in understanding the personal importance of the activity, acknowledge the individual's feelings so that he or she will feel understood, and provide interpersonal interactions that emphasize choice rather than control (Deci et al, 1994). For example, individuals can be encouraged to participate in activities at intensity levels that are comfortable for them, rather than forcing them to participate at higher intensity levels than is appropriate for their physical fitness levels. Therefore, physical activity contexts which are autonomy and competence supportive will allow individuals to maintain intrinsic motivation and facilitate greater degrees of self-determined extrinsic motivation.

The results of this study also indicated that inactive individuals tended to focus upon the barriers to their involvement whereas those in preparation and active individuals tended to focus on solutions to overcoming barriers and had greater barrier self-efficacy. This suggests that enhancing self-efficacy to overcome barriers to involvement may be particularly important for those in precontemplation and contemplation. Barrier self-efficacy can be enhanced by assisting individuals to identify the factors that they perceive as barriers to their involvement and then enhancing their self-efficacy to overcome these barriers. Bandura (1986) identified four principal sources of information that influence

self-efficacy. These include enactive attainment, vicarious experience, verbal persuasion, and physiological states. Barrier efficacy may be enhanced by assisting individuals to successfully negotiate their perceived constraints thereby providing them with mastery experiences in overcoming their perceived barriers. Not only do authentic mastery experiences enhance self-efficacy but vicarious experiences and verbal persuasion can also enhance individual's perceptions of their capabilities. Providing opportunities for individuals to learn through social modeling and providing individuals with realistic encouragement and feedback with respect to their capabilities to overcome barriers are two ways to enhance barrier self-efficacy vicariously and through verbal persuasion. In addition, individuals can be assisted in changing their perceptions of physiological changes. For example, when one experiences anxiety in anticipation of their ability to overcome barriers, it can be reinterpreted as a positive experience (excitement) rather than negative experience (vulnerability & stress).

In addition, poor performance self-efficacy and poor self-image were identified as barriers to involvement for inactive individuals. Therefore, practitioners need to ensure that activities are provided in supportive contexts so that individuals do not feel embarrassed, inadequate or self-conscious based upon their appearance, age, or skill level. Providing special classes or opportunities specifically targeted to individuals with certain physical sizes or ages may facilitate involvement of those who are self-conscious of their physical appearance or age. Involvement may be facilitated for those with poor performance self-efficacy by offering activities at various skill levels, providing a variety of options within activity contexts so that individuals perceive they can competently perform the skills, and demonstrating acceptance of various skill levels by providing a variety of activities and supportive leadership. Ensuring that media images to promote physical activity involvement portray individuals of various shapes, sizes, ethnic backgrounds, ages and skill levels participating in physical activity may also assist in facilitating participation.

The results of this study indicated that experiencing the benefits of physical activity involvement, having convenient opportunities to participate and having social support to participate are important for the adoption and maintenance of physical activity.

Goal setting strategies that assist individuals to identify their desired attainments and assist them in monitoring their progress towards their goals may be an important tool to ensure that individuals are aware of the outcomes they are experiencing and that they are participating in the appropriate activities to assist them in attaining their desired outcomes. A number of strategies may be helpful in providing more convenient opportunities for individuals. These include such things as providing physical space and facilities in a variety of locations (near residences, workplaces), encouraging active living strategies that assist individuals to become more active as part of their daily activities (walking to store, taking stairs instead of elevators), implementing policies and practices that provide flexibility and realistic expectations in terms of employment demands, and providing supports for family caregivers. Establishing buddy-systems and incorporating social interaction in physical activity opportunities may also be particularly important so that individuals who desire to be active can receive social support by developing affiliations within activity contexts and having companions to be physically active with.

The results of this study also indicated that enjoyment is a factor associated with participation in physical activity. Therefore, facilitating enjoyment of physical activity is an important consideration for practitioners. In examining sources of enjoyment in physical activity contexts, this study provided further evidence as to factors within these contexts that practitioners need to take into consideration to facilitate enjoyable experiences. In particular, this study emphasized the importance of individuals experiencing a variety of physical and psychological benefits and experiences, providing opportunities for individuals to interact socially, allowing individuals to experience a connection to nature, and facilitating perceptions of competence and self-determination as important for the enjoyment of physical activity.

The results of this study highlight the need for a variety of interventions targeted at a variety of factors to facilitate involvement in physical activity. Individual, situational and environmental factors and differences in determinants across the stages of change need to be taken into consideration in attempts to promote and encourage participation in physical activity.

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Appendix A

Design of the Overall Research Project

The data utilized for this study was collected as part of a broader research project examining physical activity involvement. Several phases of data collection were conducted. Four phases of data collection were conducted six months apart over a two-year period from May 1993 to November 1994. These four phases are outlined below and presented in Table 35 in which the variables of interest to this dissertation are highlighted.

Phase One of Data Collection

A random sample of 800 employees of a large medical institution was drawn from an employee list provided by the institution's personnel department. A questionnaire (Appendix B) assessing the stages of change, processes of change, demographic variables, and exercise behavior information, along with a cover letter assuring confidentiality and a brief explanation of the study's purpose (Appendix C), was mailed through the hospital mailing system to all subjects chosen through a random sampling technique. In order to maximize the response rate, a return envelope was included to simplify the process of returning the questionnaires by mail. In addition, a follow-up letter (Appendix D) was mailed two weeks after the questionnaire was distributed in order to thank early responders and to remind non-responders to return the questionnaire.

Phase Two of Data Collection

Stages of change and processes of change, along with open-ended questions assessing exercise facilitators and barriers were assessed with a questionnaire (Appendix E) that was mailed, along with a cover letter (Appendix F), through the hospital mailing system to all subjects who completed the first phase of data collection. Respondents

were also asked to indicate if they would be willing to be interviewed and an informed consent form was provided (Appendix G). A return envelope was included to simplify the process of returning the questionnaires by mail. A follow-up letter (Appendix H) was mailed two weeks after the questionnaire was distributed in order to thank early responders and to remind non-responders to return the questionnaire.

Phase Three of Data Collection

Stages and processes of change, as well as self-efficacy, enjoyment levels and decision balance, were assessed at phase three with a questionnaire (Appendix I), that along with a cover letter (Appendix J) was mailed to all employees who completed the second phase of data collection. A return envelope was included to simplify the process of returning the questionnaires and consent forms by mail. A follow-up letter (Appendix H) was mailed two weeks after the questionnaire was distributed in order to thank early responders and to remind non-responders to return the questionnaire.

Phase Four of Data Collection

Subjects who returned the informed consent forms agreeing to be interviewed were contacted six months following the third phase of the data collection. Face to face interviews were conducted and followed a semi-structured format. The interviewer asked the interviewee a series of questions from an interview schedule (Appendix P). The interview schedule included questions assessing changes in activity patterns over time during the previous two years of the study, factors associated with these changes, definitions of exercise, physical activity and active living, and sources of physical activity enjoyment. Interviewees were encouraged to elaborate and extend upon any issues or ideas in order to bring forward their own perspectives. All interviews were tape recorded and transcribed "verbatim".

The initial phase of data collection was conducted for the completion of a Master's thesis (Hills, 1993). The sample size of 800 was chosen so that sufficient numbers of individuals representing the five stages of exercise behavior change would be obtained to conduct the data analysis for this initial study. Upon completion of the Master's thesis, it was decided to continue the study, assessing the stages and processes of change of the original respondents over time to examine longitudinal patterns. Six-month intervals were chosen as the assessment time frame as this was the time frame proposed by Prochaska and colleagues in which individuals think about changing their behavior and in which most individuals relapse from the adoption of behavior (Prochaska & DiClemente, 1982). As such, it was believed that this time frame was sufficient enough to capture changes in intentions and behaviors and thus stages of change. It was decided to conduct a six-month and 12-month follow-up assessment of stages and processes of change in order to extend upon research to date with respect to longitudinal patterns and use of the stages and processes of change for exercise which has involved a six-month follow-up only. Other variables of interest (facilitators, barriers, enjoyment) were added to the research project as the project proceeded.

Table 35
Data Collection Phases for Overall Research Project

PHASE ONE May 1993	PHASE TWO November 1993	PHASE THREE May 1994	PHASE FOUR November 1994
N=407	N=123	N=68	N=18
Questionnaire	Questionnaire	Questionnaire	Interviews
<ul style="list-style-type: none"> - <i>Stages of Change</i> - <i>Processes of Change</i> - Demographics - Frequency, intensity, duration of exercise 	<ul style="list-style-type: none"> - <i>Stages of Change</i> - <i>Processes of Change</i> - Barriers & Facilitators 	<ul style="list-style-type: none"> - <i>Stages of Change</i> - <i>Processes of Change</i> - <i>Self-efficacy</i> - <i>Decision balance</i> - Enjoyment - Exercise self-schemata 	<ul style="list-style-type: none"> - Lifestyle Activity - Changes in activity over previous year - Meanings of physical activity, exercise, active living - Enjoyment - Barriers and Facilitators

APPENDIX B. Questionnaire #1

EXERCISE BEHAVIOR SURVEY

1. Please check the **one** statement that best represents your current exercise behavior.

****Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.**

- "I currently do not exercise, and I do not intend to start exercising in the next six months."
- "I currently do not exercise, but I am thinking about starting to exercise in the next six months."
- "I currently exercise some but not regularly."
- "I currently exercise regularly, but I have only begun doing so within the last six months."
- "I currently exercise regularly, and have done so for longer than six months."

2. The following experiences can affect the exercise habits of some people. Think of any similar experiences you may be currently having or have had **during the past month**. Then rate how frequently the event occurs. Please check the number that best describes your answer to each experience. **How frequently does this occur?**

	Never	Occasionally			Repeatedly
	1	2	3	4	5
I get upset when I see information on the negative aspects of inactivity .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instead of remaining inactive I engage in some physical activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself I am able to keep exercising if I want to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I put things around my home to remind me of exercising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself that if I try hard enough I can keep exercising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I recall information people have personally given me on the benefits of exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I make commitments to exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I reward myself when I exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I think about information from articles and advertisements on how to make exercise a regular part of my life.	()	()	()	()	()
I keep things around my place of work that remind me to exercise.	()	()	()	()	()
I find society changing in ways that make it easier for the exerciser.	()	()	()	()	()
Warnings about health <u>hazards</u> of inactivity affect me emotionally.	()	()	()	()	()
Dramatic portrayals of the evils of inactivity affect me emotionally.	()	()	()	()	()
I react emotionally to warnings about an inactive lifestyle.	()	()	()	()	()
I worry that inactivity can be harmful to my body .	()	()	()	()	()
I am considering the idea that regular exercise would make me a healthier, happier person to be around.	()	()	()	()	()
I have someone on whom I can depend when I am having problems with exercising.	()	()	()	()	()
I read articles about exercise in an attempt to learn more about it.	()	()	()	()	()
I try to set realistic exercise goals for myself rather than setting myself up for failure by expecting too much.	()	()	()	()	()
I have a healthy friend that encourages me to exercise when I don't feel up to it.	()	()	()	()	()
When I exercise, I tell myself that I am being good to myself by taking care of my body.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
Exercise is my special time to relax and recover from the days worries, not a task to get out of the way.	()	()	()	()	()
I am aware of more and more people encouraging me to exercise these days.	()	()	()	()	()
I do something nice for myself for making efforts to exercise more.	()	()	()	()	()
I have someone who points out my rationalizations for not exercising.	()	()	()	()	()
I have someone who provides feedback about my exercising.	()	()	()	()	()
I remove things that contribute to my inactivity.	()	()	()	()	()
I am the only one responsible for my health and only I can decide whether or not I will exercise.	()	()	()	()	()
I look for information related to exercise.	()	()	()	()	()
I avoid spending long periods of time in environments that promote inactivity.	()	()	()	()	()
I feel I would be a better role model for others if I exercised regularly.	()	()	()	()	()
I think about the type of person I will be if I keep exercising.	()	()	()	()	()
I notice that more businesses are encouraging their employees to exercise by offering fitness courses and time off to work out.	()	()	()	()	()
I wonder how my inactivity affects those people who are close to me.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I realize that I might be able to influence others to be healthier if I would exercise more.	()	()	()	()	()
I get frustrated with myself when I don't exercise.	()	()	()	()	()
I am aware that many health clubs now provide free babysitting services to their members.	()	()	()	()	()
Some of my close friends might exercise more if I would.	()	()	()	()	()
I consider the fact that I would feel more confident in myself if I exercised regularly.	()	()	()	()	()
When I feel tired, I make myself exercise anyway because I know I will feel better afterward.	()	()	()	()	()
When I'm feeling tense, I find exercise a great way to relieve my worries.	()	()	()	()	()
Warnings about an inactive lifestyle upset me.	()	()	()	()	()

3. On average, how many times per week do you currently participate in exercise?

- I currently do not exercise
- 1-2 times per week
- 3-5 times per week
- 6-7 times per week
- 8 or more times per week

4. On average, what is the intensity of your exercise?

- I currently do not exercise
- Light (slight increase in breathing)
- Moderate (breathing heavily but still able to carry on a conversation; onset of sweating)
- Vigorous (breathing heavily so that it is difficult to carry on a conversation; begin to feel fatigue)

5. What is the average length of your exercise sessions?

- I currently do not exercise
- Less than 20 minutes
- 20 - 40 minutes
- More than 40 minutes

6. Are you aware that the University of Alberta Hospitals has a staff fitness and recreation centre?

- Yes
- No

7. Are you a member of or participate in the programs offered by the Pulse Generator, the University of Alberta Hospitals' fitness and recreation centre?

- Yes
- No

8. Are you a member of or participate in the programs offered by other fitness and recreation facilities?

- Yes
- No

DEMOGRAPHIC INFORMATION

GENDER: Male Female

AGE: _____

OCCUPATIONAL CLASSIFICATION: General Support
 Clerical Support
 Physician
 Paramedical Technical/Professional
 Nursing
 Management
 Other _____ (Please specify)

EMPLOYMENT STATUS: Full-time
 Part-time
 Relief

DO YOU WORK SHIFTS? Yes No

If Yes, what shifts do you work? Days
 Evenings
 Nights
 Rotating

If Yes, how long are your shifts? 8 hours
 10 hours
 12 hours
 Other

WOULD YOU LIKE A COPY OF THE RESULTS OF THIS RESEARCH MAILED TO YOU?
 Yes No

APPENDIX C: Cover Letter #1

Dear hospital employee:

You have been randomly selected from all hospital staff to participate in a study we are conducting concerning the health behaviors of the employees of the University of Alberta Hospitals. .

We request that you complete the enclosed survey and mail it back to us in the envelope provided. The survey will take approximately ten minutes to complete. A follow-up study will be undertaken in approximately six months in which another survey will be mailed to you to complete. Your participation in this study is voluntary, therefore you may decline to complete the survey or withdraw from the study at any time. However, for us to obtain valid results, it is important that you participate and complete the survey as accurately and completely as possible and return it to us.

Your responses will be kept completely confidential. You have been assigned an identification number that is located on the first page of the survey. Only the investigator will have access to your name and associated identification number. This information will be kept in a locked filing cabinet. The identification number is used only to check whether your survey has been mailed back to us. Your name will never be placed on the survey or used in any aspect of reporting the results of this study.

The overall results of this study will be presented in a Masters Thesis and may be published in a journal or presented at a research conference. As well, a summary report of the results will be provided to the University of Alberta Hospitals Human Resources Department and will also be made available to all participants in this study. If you would like a summary of the results for yourself, please indicate so on the last question of this survey. It is hoped that the results of this study will provide increased knowledge for you in terms of your own exercise behavior as well as provide a greater understanding of the exercise behavior of the Hospitals' employees in general.

If you require further information or have any questions regarding this study, please contact me at 492-5702. Thank you very much for your assistance.

Sincerely,

Leonard M. Wankel, PhD
Professor

APPENDIX D: Follow-up Letter #1

EXERCISE BEHAVIOR STUDY

As part of a study on the health behaviors of the University of Alberta Hospitals employees, a survey regarding your exercise behavior was recently mailed to you.

If you have completed the survey already, please accept our sincere thanks. If not, could you please return it today. It is important that you complete the survey as accurately and completely as possible in order for us to obtain valid results.

If you did not receive the survey or have misplaced it, please call me at 492-5607 and we will send you another copy.

Sincerely,

Leonard M. Wankel, PhD
Professor

APPENDIX E: Questionnaire #2

EXERCISE BEHAVIOR SURVEY

1. The following experiences can affect the exercise habits of some people. Think of any similar experiences you may be currently having or have had **during the past month**. Then rate how frequently the event occurs. Please check the number that best describes your answer to each experience. **How frequently does this occur?**

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I get upset when I see information on the negative aspects of inactivity .	()	()	()	()	()
Instead of remaining inactive I engage in some physical activity.	()	()	()	()	()
I tell myself I am able to keep exercising if I want to.	()	()	()	()	()
I put things around my home to remind me of exercising.	()	()	()	()	()
I tell myself that if I try hard enough I can keep exercising.	()	()	()	()	()
I recall information people have personally given me on the benefits of exercise.	()	()	()	()	()
I make commitments to exercise.	()	()	()	()	()
I reward myself when I exercise.	()	()	()	()	()
I think about information from articles and advertisements on how to make exercise a regular part of my life.	()	()	()	()	()
I keep things around my place of work that remind me to exercise.	()	()	()	()	()
I find society changing in ways that make it easier for the exerciser.	()	()	()	()	()
Warnings about health <u>hazards</u> of inactivity affect me emotionally.	()	()	()	()	()
Dramatic portrayals of the evils of inactivity affect me emotionally.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I react emotionally to warnings about an inactive lifestyle.	()	()	()	()	()
I worry that inactivity can be harmful to my body .	()	()	()	()	()
I am considering the idea that regular exercise would make me a healthier, happier person to be around.	()	()	()	()	()
I have someone on whom I can depend when I am having problems with exercising.	()	()	()	()	()
I read articles about exercise in an attempt to learn more about it.	()	()	()	()	()
I try to set realistic exercise goals for myself rather than setting myself up for failure by expecting too much.	()	()	()	()	()
I have a healthy friend that encourages me to exercise when I don't feel up to it.	()	()	()	()	()
When I exercise, I tell myself that I am being good to myself by taking care of my body.	()	()	()	()	()
Exercise is my special time to relax and recover from the days worries, not a task to get out of the way.	()	()	()	()	()
I am aware of more and more people encouraging me to exercise these days.	()	()	()	()	()
I do something nice for myself for making efforts to exercise more.	()	()	()	()	()
I have someone who points out my rationalizations for not exercising.	()	()	()	()	()
I have someone who provides feedback about my exercising.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I remove things that contribute to my inactivity.	()	()	()	()	()
I am the only one responsible for my health and only I can decide whether or not I will exercise.	()	()	()	()	()
I look for information related to exercise.)	()	()	()	()	()
I avoid spending long periods of time in environments that promote inactivity.	()	()	()	()	()
I feel I would be a better role model for others if I exercised regularly.	()	()	()	()	()
I think about the type of person I will be if I keep exercising.	()	()	()	()	()
I notice that more businesses are encouraging their employees to exercise by offering fitness courses and time off to work out.	()	()	()	()	()
I wonder how my inactivity affects those people who are close to me.	()	()	()	()	()
I realize that I might be able to influence others to be healthier if I would exercise more.	()	()	()	()	()
I get frustrated with myself when I don't exercise.	()	()	()	()	()
I am aware that many health clubs now provide free babysitting services to their members.	()	()	()	()	()
Some of my close friends might exercise more if I would.	()	()	()	()	()
I consider the fact that I would feel more confident in myself if I exercised regularly.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
When I feel tired, I make myself exercise anyway because I know I will feel better afterward.	()	()	()	()	()
When I'm feeling tense, I find exercise a great way to relieve my worries.	()	()	()	()	()
Warnings about an inactive lifestyle upset me.	()	()	()	()	()

2. Please check the **one** statement that best represents your current exercise behavior.

***Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.*

- A. () "I currently do not exercise, and I do not intend to start exercising in the next six months."
- B. () "I currently do not exercise, but I am thinking about starting to exercise in the next six months."
- C. () "I currently exercise some but not regularly."
- D. () "I currently exercise regularly, but I have only begun doing so within the last six months."
- E. () "I currently exercise regularly, and have done so for longer than six months."

Please answer **one** of questions 3 to 6 as follows:

- If you checked off statement **A** in question 2, answer **question 3**
- If you checked off statement **B** in question 2, answer **question 4**
- If you checked off statement **C** in question 2, answer **question 5**
- If you checked off statement **D or E** in question 2, answer **question 6**

3. (a) Is there anything that has impeded you from participating in exercise? _____

(b) Is there anything that might cause you to consider beginning to exercise? _____

4. (a) Is there anything that has impeded you from participating in exercise? _____

(b) Is there anything that may assist you in beginning to exercise? _____

5. (a) Would you like to participate in regular exercise? () yes () no

(b) Is there anything that might help you to participate in regular exercise? _____

(c) Is there anything that has impeded you from participating in regular exercise? _____

6. Is there anything that has assisted you in participating in regular exercise? _____

APPENDIX F: Cover Letter #2

Dear colleague:

Last May, you were kind enough to participate in our survey concerning exercise. The response was tremendous, we thank you for that. As we indicated at the time of the initial survey, we would like to call on you again to complete a further questionnaire. It is very important that we obtain this further information as exercise involvement is a long-term health behaviour, therefore it is important to understand factors that influence involvement over an extended time period. To help us do this, and to make the best use of the information already collected, we have two requests. First we ask that you complete the enclosed questionnaire and mail it back to us in the enclosed envelope. Second, we ask that you sign and return with your questionnaire the enclosed consent form indicating your willingness to be interviewed about your exercise involvement late next spring. Please note we will not interview everyone just a random sample of those completing the questionnaire part of the study. It is important that we have a representative sample of all participants regardless of how much or how little that they participate in exercise. We would be extremely grateful if you would agree to participate in these last two phases of the study so that we can obtain as much, and as useful information as possible about this increasingly important health behaviour.

Although we strongly encourage your participation in the study, your involvement is completely voluntary, you may decline to participate at any time. All responses will be kept completely confidential. Your name will never be placed on the survey or used in any aspect of reporting the results of the study. Once we have completed the full study we will mail a summary of the results to you. As well we will arrange group information sessions at which time we will discuss the results of the study and discuss the implications for establishing a successful exercise program.

A number of you noted on the original survey that you found some of the questions somewhat "odd". We would like to indicate that the questionnaire was developed and validated in the United States. Although we agree with you that some questions should be improved, at this point it is important that we maintain the questionnaire in its original form which has been demonstrated to acceptable validity and reliability. Accordingly please answer each question as accurately as possible. If you do have a comment about a particular item, please indicate this on the sheet. We will take these into account for research with the instrument.

If you wish further information or have any questions concerning the study, please contact either of us. Thank you sincerely for your assistance. We hope that we will have some valuable information to share with you when the study is complete.

Sincerely,

Leonard M. Wankel, PhD
Telephone: 492-0996

Carol A. Hills, M.A.
Telephone: 436-1678

APPENDIX G: Informed Consent Form

**EXERCISE BEHAVIOR STUDY
INFORMED CONSENT**

*Please complete and return one copy to the investigator.
Keep one copy for your own records.*

This is to certify that I have read and understood the information provided in the enclosed cover letter regarding this study and that I agree to participate as a volunteer in this study. I am willing to be interviewed about my exercise involvement next spring.

I understand that there are no health risks to me resulting from my participation in this research and that I am free to withdraw my consent and terminate my participation at any time. I have been given information on how to contact the researcher to ask any questions I have regarding this study.

Signed.

Participant

Phone Number

Witness

Date

Investigator

APPENDIX H: Follow-up Letter #2

EXERCISE BEHAVIOR STUDY

As part of a study on the health behaviors of the University of Alberta Hospitals employees, a survey regarding your exercise behavior was recently mailed to you.

If you have completed the survey already, please accept our sincere thanks. If not, could you please return it today. It is important that you complete the survey as accurately and completely as possible in order for us to obtain valid results.

If you did not receive the survey or have misplaced it, please call us and we will send you another copy.

Sincerely,

Leonard M. Wankel, PhD
Telephone: 492-0996

Carol A. Hills, M.A.
Telephone: 436-1678

APPENDIX I: Questionnaire #3

EXERCISE BEHAVIOR SURVEY

1. Please check the one statement that best represents your current exercise behavior.

***Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.*

- "I currently do not exercise, and I do not intend to start exercising in the next six months."
- "I currently do not exercise, but I am thinking about starting to exercise in the next six months."
- "I currently exercise some but not regularly."
- "I currently exercise regularly, but I have only begun doing so within the last six months."
- "I currently exercise regularly, and have done so for longer than six months."

2. The following experiences can affect the exercise habits of some people. Think of any similar experiences you may be currently having or have had **during the past month**. Then rate how frequently the event occurs. Please check the number that best describes your answer to each experience. **How frequently does this occur?**

	Never	Occasionally			Repeatedly
	1	2	3	4	5
I get upset when I see information on the negative aspects of inactivity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instead of remaining inactive I engage in some physical activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself I am able to keep exercising if I want to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I put things around my home to remind me of exercising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tell myself that if I try hard enough I can keep exercising.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I recall information people have personally given me on the benefits of exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I make commitments to exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I reward myself when I exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I think about information from articles and advertisements on how to make exercise a regular part of my life.	()	()	()	()	()
I keep things around my place of work that remind me to exercise.	()	()	()	()	()
I find society changing in ways that make it easier for the exerciser.	()	()	()	()	()
Warnings about health <u>hazards</u> of inactivity affect me emotionally.	()	()	()	()	()
Dramatic portrayals of the evils of inactivity affect me emotionally.	()	()	()	()	()
I react emotionally to warnings about an inactive lifestyle.	()	()	()	()	()
I worry that inactivity can be harmful to my body .	()	()	()	()	()
I am considering the idea that regular exercise would make me a healthier, happier person to be around.	()	()	()	()	()
I have someone on whom I can depend when I am having problems with exercising.	()	()	()	()	()
I read articles about exercise in an attempt to learn more about it.	()	()	()	()	()
I try to set realistic exercise goals for myself rather than setting myself up for failure by expecting too much.	()	()	()	()	()
I have a healthy friend that encourages me to exercise when I don't feel up to it.	()	()	()	()	()
When I exercise, I tell myself that I am being good to myself by taking care of my body.	()	()	()	()	()
Exercise is my special time to relax and recover from the days worries, not a task to get out of the way.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I am aware of more and more people encouraging me to exercise these days.	()	()	()	()	()
I do something nice for myself for making efforts to exercise more.	()	()	()	()	()
I have someone who points out my rationalizations for not exercising.	()	()	()	()	()
I have someone who provides feedback about my exercising.	()	()	()	()	()
I remove things that contribute to my inactivity.	()	()	()	()	()
I am the only one responsible for my health and only I can decide whether or not I will exercise.	()	()	()	()	()
I look for information related to exercise.	()	()	()	()	()
I avoid spending long periods of time in environments that promote inactivity.	()	()	()	()	()
I feel I would be a better role model for others if I exercised regularly.	()	()	()	()	()
I think about the type of person I will be if I keep exercising.	()	()	()	()	()
I notice that more businesses are encouraging their employees to exercise by offering fitness courses and time off to work out.	()	()	()	()	()
I wonder how my inactivity affects those people who are close to me.	()	()	()	()	()
I realize that I might be able to influence others to be healthier if I would exercise more.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I get frustrated with myself when I don't exercise.	()	()	()	()	()
I am aware that many health clubs now provide free babysitting services to their members.	()	()	()	()	()
Some of my close friends might exercise more if I would.	()	()	()	()	()
I consider the fact that I would feel more confident in myself if I exercised regularly.	()	()	()	()	()
When I feel tired, I make myself exercise anyway because I know I will feel better afterward.	()	()	()	()	()
When I'm feeling tense, I find exercise a great way to relieve my worries.	()	()	()	()	()
Warnings about an inactive lifestyle upset me.	()	()	()	()	()
I enjoy myself when I exercise	()	()	()	()	()

3. Please check the number that best represents how confident you are that you can participate in exercise under the following conditions.

	not at all confident					very confident	
	1	2	3	4	5	6	7
I am confident I can participate in exercise when I am tired	()	()	()	()	()	()	()
I am confident I can participate in exercise when I am in a bad mood	()	()	()	()	()	()	()
I am confident I can participate in exercise when I feel I don't have the time	()	()	()	()	()	()	()
I am confident I can participate in exercise when I am on vacation	()	()	()	()	()	()	()
I am confident I can participate in exercise when it is raining or snowing	()	()	()	()	()	()	()

4. Please check the number that best describes how you feel about exercise

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()
I enjoy it						I hate it
1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()
I feel bored						I feel interested
1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()
I dislike it						I like it
1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()
I find it unpleasant						I find it pleasant

5. How much do you enjoy participating in exercise?

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()
not at all						a great deal

6. Please check the number that best represents the extent to which each of the following phrases describes you and how important each phrase is to the image you have of yourself.

I am someone who exercises regularly

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 <input checked="" type="checkbox"/>	8 ()	9 ()	10 ()	11 ()
Does not describe me									Describes me	

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 <input checked="" type="checkbox"/>	8 ()	9 ()	10 ()	11 ()
Not at all important									Very important	

I am someone who keeps in shape

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 <input checked="" type="checkbox"/>	8 ()	9 ()	10 ()	11 ()
Does not describe me									Describes me	

1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 <input checked="" type="checkbox"/>	8 ()	9 ()	10 ()	11 ()
Not at all									Very	

important	I am physically active										important
1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()	8 ()	9 ()	10 ()	11 ()	
Does not describe me									Describes me		
1 ()	2 ()	3 ()	4 ()	5 ()	6 ()	7 ()	8 ()	9 ()	10 ()	11 ()	
Not at all important									Very important		

7. Please check the number that best indicates how important each of the following statements is with respect to your decision to exercise or not to exercise.

	Not at all important		Extremely Important		
	1	2	3	4	5
I would have more energy for my family and friends if I exercised regularly	()	()	()	()	()
Regular exercise would help me relieve tension	()	()	()	()	()
I think I would be too tired to do my daily work after exercising	()	()	()	()	()
I would feel more confident if I exercised regularly	()	()	()	()	()
I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather	()	()	()	()	()
I would sleep more soundly if I exercised regularly	()	()	()	()	()
I would feel good about myself if I kept my commitment to exercise regularly	()	()	()	()	()
I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast	()	()	()	()	()
Regular exercise would take too much of my time	()	()	()	()	()
I would like my body better if I exercised regularly	()	()	()	()	()
It would be easier for me to perform routine physical tasks if I exercised regularly	()	()	()	()	()
I would have less time for my family and friends if I exercised regularly	()	()	()	()	()

I would feel less stressed if I exercised regularly	()	()	()	()	()
	Not at all important		Extremely Important		
	1	2	3	4	5
I would feel more comfortable with my body if I exercised regularly	()	()	()	()	()
At the end of the day, I am too exhausted to exercise	()	()	()	()	()
Regular exercise would help me have a more positive outlook on life	()	()	()	()	()

*Thank you for participating
in this study*

APPENDIX J: Cover Letter #3

Dear colleague:

During this past year, you were kind enough to participate in our surveys concerning exercise. We thank you for participating in our study. We would like to call on you again to complete a further questionnaire. It is very important that we obtain this further information as exercise involvement is a long-term health behaviour, therefore it is important to understand factors that influence involvement over an extended time period. To help us do this, and to make the best use of the information already collected, we ask that you complete the enclosed questionnaire and mail it back to us in the enclosed envelope. It is important that we have a representative sample of all participants regardless of how much or how little that they participate in exercise. We would be extremely grateful if you would agree to participate in this last phase of the study so that we can obtain as much, and as useful information as possible about this increasingly important health behaviour.

Although we strongly encourage your participation in the study, your involvement is completely voluntary. You may decline to participate at any time. All responses will be kept completely confidential. Your name will never be placed on the survey or used in any aspect of reporting the results of the study. Once we have completed the full study we will mail a summary of the results to you.

Please answer each question as accurately as possible. If you do have a comment about a particular item, please indicate this on the sheet. We will take these into account for research with the instrument.

If you wish further information or have any questions concerning the study, please contact either of us. Thank you sincerely for your assistance. We hope that we will have some valuable information to share with you when the study is complete.

Sincerely,

Leonard M. Wankel, PhD
Telephone: 492-0996

Carol A. Hills, M.A.
Telephone: 436-1678

APPENDIX K: Follow-up Letter #3

EXERCISE BEHAVIOR STUDY

As part of a study on the health behaviors of the University of Alberta Hospitals employees, a survey regarding your exercise behavior was recently mailed to you.

If you have completed the survey already, please accept our sincere thanks. If not, could you please return it today. It is important that you complete the survey as accurately and completely as possible in order for us to obtain valid results.

If you did not receive the survey or have misplaced it, please call us and we will send you another copy.

Sincerely,

Leonard M. Wankel, PhD
Telephone: 492-0996

Carol A. Hills, M.A.
Telephone: 436-1678

APPENDIX L: Stage of Change Questionnaire

Please check the **one** statement that best represents your current exercise behavior.

****Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.**

- "I currently do not exercise, and I do not intend to start exercising in the next six months."
- "I currently do not exercise, but I am thinking about starting to exercise in the next six months."
- "I currently exercise some but not regularly."
- "I currently exercise regularly, but I have only begun doing so within the last six months."
- "I currently exercise regularly, and have done so for longer than six months."

APPENDIX M: Processes of Change Questionnaire

The following experiences can affect the exercise habits of some people. Think of any similar experiences you may be currently having or have had **during the past month**. Then rate how frequently the event occurs. Please check the number that best describes your answer to each experience. **How frequently does this occur?**

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I get upset when I see information on the negative aspects of inactivity .	()	()	()	()	()
Instead of remaining inactive I engage in some physical activity.	()	()	()	()	()
I tell myself I am able to keep exercising if I want to.	()	()	()	()	()
I put things around my home to remind me of exercising.	()	()	()	()	()
I tell myself that if I try hard enough I can keep exercising.	()	()	()	()	()
I recall information people have personally given me on the benefits of exercise.	()	()	()	()	()
I make commitments to exercise.	()	()	()	()	()
I reward myself when I exercise.	()	()	()	()	()

	Never	Occasionally			Repeatedly	
	1	2	3	4	5	
I think about information from articles and advertisements on how to make exercise a regular part of my life.	()	()	()	()	()	
I keep things around my place of work that remind me to exercise.	()	()	()	()	()	
I find society changing in ways that make it easier for the exerciser.	()	()	()	()	()	
Warnings about health <u>hazards</u> of inactivity affect me emotionally.	()	()	()	()	()	
Dramatic portrayals of the evils of inactivity affect me emotionally.	()	()	()	()	()	
I react emotionally to warnings about an inactive lifestyle.	()	()	()	()	()	
I worry that inactivity can be harmful to my body .	()	()	()	()	()	
I am considering the idea that regular exercise would make me a healthier, happier person to be around.	()	()	()	()	()	
I have someone on whom I can depend when I am having problems with exercising.	()	()	()	()	()	
I read articles about exercise in an attempt to learn more about it.	()	()	()	()	()	
I try to set realistic exercise goals for myself rather than setting myself up for failure by expecting too much.	()	()	()	()	()	
I have a healthy friend that encourages me to exercise when I don't feel up to it.	()	()	()	()	()	
When I exercise, I tell myself that I am being good to myself by taking care of my body.	()	()	()	()	()	

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
Exercise is my special time to relax and recover from the days worries, not a task to get out of the way.	()	()	()	()	()
I am aware of more and more people encouraging me to exercise these days.	()	()	()	()	()
I do something nice for myself for making efforts to exercise more.	()	()	()	()	()
I have someone who points out my rationalizations for not exercising.	()	()	()	()	()
I have someone who provides feedback about my exercising.	()	()	()	()	()
I remove things that contribute to my inactivity.	()	()	()	()	()
I am the only one responsible for my health and only I can decide whether or not I will exercise.	()	()	()	()	()
I look for information related to exercise.	()	()	()	()	()
I avoid spending long periods of time in environments that promote inactivity.	()	()	()	()	()
I feel I would be a better role model for others if I exercised regularly.	()	()	()	()	()
I think about the type of person I will be if I keep exercising.	()	()	()	()	()
I notice that more businesses are encouraging their employees to exercise by offering fitness courses and time off to work out.	()	()	()	()	()
I wonder how my inactivity affects those people who are close to me.	()	()	()	()	()

	Never	Occasionally		Repeatedly	
	1	2	3	4	5
I realize that I might be able to influence others to be healthier if I would exercise more.	()	()	()	()	()
I get frustrated with myself when I don't exercise.	()	()	()	()	()
I am aware that many health clubs now provide free babysitting services to their members.	()	()	()	()	()
Some of my close friends might exercise more if I would.	()	()	()	()	()
I consider the fact that I would feel more confident in myself if I exercised regularly.	()	()	()	()	()
When I feel tired, I make myself exercise anyway because I know I will feel better afterward.	()	()	()	()	()
When I'm feeling tense, I find exercise a great way to relieve my worries.	()	()	()	()	()

APPENDIX N: Decision Balance Questionnaire

Please check the number that best indicates how important each of the following statements is with respect to your decision to exercise or not to exercise.

	Not at all important		Extremely Important		
	1	2	3	4	5
I would have more energy for my family and friends if I exercised regularly	()	()	()	()	()
Regular exercise would help me relieve tension	()	()	()	()	()
I think I would be too tired to do my daily work after exercising	()	()	()	()	()
I would feel more confident if I exercised regularly	()	()	()	()	()
I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather	()	()	()	()	()
I would sleep more soundly if I exercised regularly	()	()	()	()	()
I would feel good about myself if I kept my commitment to exercise regularly	()	()	()	()	()
I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast	()	()	()	()	()
Regular exercise would take too much of my time	()	()	()	()	()
I would like my body better if I exercised regularly	()	()	()	()	()
It would be easier for me to perform routine physical tasks if I exercised regularly	()	()	()	()	()
I would have less time for my family and friends if I exercised regularly	()	()	()	()	()
I would feel less stressed if I exercised regularly	()	()	()	()	()
I would feel more comfortable with my body if I exercised regularly	()	()	()	()	()
At the end of the day, I am too exhausted to exercise	()	()	()	()	()

Regular exercise would help me have a more positive outlook on life () () () () ()

APPENDIX O: Self-Efficacy Questionnaire

Please check the number that best represents how confident you are that you can participate in exercise under the following conditions.

	not at all confident					very confident	
	1	2	3	4	5	6	7
I am confident I can participate in exercise when I am tired	()	()	()	()	()	()	()
I am confident I can participate in exercise when I am in a bad mood	()	()	()	()	()	()	()
I am confident I can participate in exercise when I feel I don't have the time	()	()	()	()	()	()	()
I am confident I can participate in exercise when I am on vacation	()	()	()	()	()	()	()
I am confident I can participate in exercise when it is raining or snowing	()	()	()	()	()	()	()

APPENDIX P: Interview Schedule

1. Lifestyle - when, where and how physical activity is a part of their lives

Can you describe a typical day in your life?

What daily activities do you typically do?

Do you see physical activity as a part of your daily life?

2. Activity Changes Over Past Year - in their own words, how their activity has changed (or not) and why.

In thinking back over the past six months (past year), has your (1) level of exercise, (2) frequency, (3) duration, (4) type stayed the same or has it changed? If it has changed, how has it changed?

Q1=May 1993, Q2=Nov. 1993, Q3=June 1994 (Use stage info from questionnaires)

What do you think has caused it to stay the same (or changed)?

3. Activities - what activities do they do - what do they consider exercise

What physical activities do you participate in?

Do you consider all of these activities exercise? If yes - why? If no - which ones and why not?

What is the difference between exercise and physical activity?

Have you heard of "active living?" If yes, what does this mean to you?

4. Degree of Internalization

What are your reasons for exercising/not exercising?

What does exercise do for you?

Do you see exercise as something you choose to do or something you have to do? Why do you think you see it that way?

Think of the last time that you exercised. Can you describe what you did? Can you describe what you were feeling (1) before, (2) during, (3) immediately after? What do you think you would have felt like if you did not do this exercise session. Do you think this is typical of the way you usually feel when you do/do not exercise?

5. Enjoyment - is enjoyment emphasized at certain stages, what makes activity enjoyable

Do you enjoy exercising - participating in physical activity? What is it that makes it enjoyable/not enjoyable?

Are there certain activities you enjoy more so than others? If so, what is it that makes these activities more enjoyable than others?

Are there certain activities you don't currently participate in that you would like to do? Why would you like to do them? What is keeping you from doing them?

Do you view exercise as positive or negative? Why? What could be changed about exercise to make you feel more positive about it.

6. Future Involvement

What do you intend to do regarding your participation in physical activity/exercise over the next 6 months (next year)?

What do you think would be most helpful to you to maintain long-term (life long), regular involvement in physical activity - by this we mean participating 3 or more times per week.

APPENDIX Q: Enjoyment Scales

PACES Measure

Please check the number that best describes how you feel about exercise.

1	2	3	4	5	6	7
()	()	()	()	()	()	()
I enjoy it						I hate it

1	2	3	4	5	6	7
()	()	()	()	()	()	()
I feel bored						I feel interested

1	2	3	4	5	6	7
()	()	()	()	()	()	()
I dislike it						I like it

1	2	3	4	5	6	7
()	()	()	()	()	()	()
I find it unpleasant						I find it pleasant

ENJOYMENT Measure

How much do you enjoy participating in exercise?

1	2	3	4	5	6	7
()	()	()	()	()	()	()
not at all						a great deal

APPENDIX R

Occupation-Related Variables by Stage of Change Frequencies and Results of Chi Square Analyses

Demographic Variable	Phase 1 Stage of Change			χ^2 (df=2)	p
	Inactive (n=80)	Preparer (n=190)	Active (n=130)		
Employed Full-Time	63	134	91	4.999	.172
Employed Part-Time	14	41	34	4.260	.235
Relief Employee	3	15	5	3.550	.314
Shiftwork					
Days	24	69	41	1.607	.658
Evenings	15	46	28	1.285	.733
Nights	14	40	19	3.768	.288
Rotating	10	23	9	2.721	.437
<12 hours	30	82	56	1.299	.730
> 12 hours	15	43	18	5.563	.135
Occupational Classification					
Support	21	29	27	3.771	.287
Paramedical/Professional	21	35	32	3.030	.387
Nurse	28	108	54	9.324	.025
Management	7	9	9	2.190	.534
Other	4	10	7	.430	.940

Demographic Variable	Phase 2 Stage of Change			χ^2 (df=2)	p
	Inactive (n=30)	Preparer (n=46)	Active (n=46)		
Employed Full-Time	21	30	33	.933	.817
Employed Part-Time	7	9	12	.857	.836
Relief Employee	2	7	1	5.453	.141
Shiftwork					
Days	14	15	15	2.507	.474
Evenings	9	9	10	1.483	.686
Nights	6	12	7	1.941	.585
Rotating	4	0	5	6.168	.104
<12 hours	14	22	18	1.187	.756
> 12 hours	7	9	5	2.488	.477
Occupational Classification					
Support	4	7	6	.502	.918
Paramedical	6	12	15	1.875	.599
Nurse	16	25	15	2.801	.423
Management	1	3	4	1.541	.400
Other	2	2	3	.327	.955

Demographic Variable	Phase 3 Stage of Change			χ^2 (df=2)	p
	Inactive (n=11)	Preparer (n=24)	Active (n=31)		
Employed Full-Time	9	13	22	3.082	.214
Employed Part-Time	1	7	7	1.732	.421
Relief Employee	1	4	2	1.521	.467
Shiftwork					
Days	4	9	9	.491	.782
Evenings	2	5	7	.097	.953
Nights	3	6	5	.927	.629
Rotating	1	2	2	.113	.946
<12 hours	6	11	11	.420	.811
> 12 hours	4	4	4	3.062	.216
Occupational Classification					
Support	0	3	3	.791	.673
Paramedical	4	2	13	7.820	.212
Nurse	5	16	11	5.315	.070
Management	1	2	3	.030	.985
Other	1	1	1	.656	.720

APPENDIX S

Chi Square Results: Demographic Variable Comparisons between Study Participants and Drop-Outs

Frequencies and Chi Square Results Between Phase 2 Participants and Drop-outs

Demographic Variable	Phase 2 Participant	Phase 2 Drop-Out	χ^2 (df=1)	p
Employed Full-Time	288	204	1.150	.283
Employed Part-Time	89	61	.120	.729
Relief Employee	23	13	2.118	.146
Shiftwork				
Days	134	90	.451	.502
Evenings	89	61	.071	.790
Nights	73	48	.773	.379
Rotating	42	33	1.874	.171
<12 hours	168	114	.148	.700
>12 hours	85	63	.245	.621
Occupational Classification				
Support	77	60	.215	.643
Paramedical	88	55	2.738	.098
Nurse	190	130	.160	.689
Management	25	17	.052	.820
Other	21	14	.119	.730
Gender				
Male	21	45	.547	.761
Female	101	239		

Frequencies and Chi Square Results Between Phase 3 Participants and Drop-outs

Demographic Variable	Phase 3 Participant	Phase 3 Drop-Out	χ^2 (df=1)	p
Employed Full-Time	44	40	1.335	.248
Employed Part-Time	14	14	.034	.854
Relief Employee	7	3	3.627	.060
Shiftwork				
Days	22	22	.004	.951
Evenings	14	14	.037	.847
Nights	14	11	.574	.449
Rotating	5	4	.745	.338
<12 hours	28	26	.002	.966
>12 hours	12	10	.013	.911
Occupational Classification				
Support	6	8	2.658	.103
Paramedical	19	14	2.208	.137
Nurse	32	28	.021	.884
Management	6	2	1.188	.276
Other	3	3	.061	.805
Gender			.592	.744
Male	9	12		
Female	57	44		

APPENDIX T
ANOVA and Chi Square Results: Demographic Variable Comparisons between Stage Pattern Groups

Frequencies and Chi Square Results for Stage Pattern Phase 1-Phase 2

Demographic Variable	Stable Active (n=30)	Stable Inactive (n=42)	Progressor (n=21)	Regressor (n=19)	χ^2 (df=3)	p
Gender					2.951	.399
Male	4	5	7	3		
Female	26	37	19	16		
Employed Full-Time	21	26	21	11	3.572	.312
Employed Part-Time	8	8	5	7	2.729	.435
Relief Employee	1	8	0	1	3.660	.220
Shiftwork						
Days	11	18	6	6	2.897	.408
Evenings	8	13	2	5	5.086	.166
Nights	6	10	4	4	.708	.871
Rotating Shifts	4	1	1	3	5.309	.151
<12 hours	12	24	9	7	4.083	.253
>12 hours	4	6	4	6	1.502	.682
Occupational Classification						
Support	4	5	4	2	3.812	.282
Paramedical	7	13	10	2	4.840	.184
Nurse	15	22	9	12	3.864	.276
Management	2	2	3	1	1.261	.738
Other	1	3	2	1	.627	.890

Average Age, Age Ranges, and ANOVA Results

	Stage Pattern Group				$F_{(3,116)}$	p
	Stable Actives	Stable Inactives	Progressors	Regressors		
Age (Average & Range)	44.70 yrs (33-61 yrs)	45.20 yrs (36-61 yrs)	46.28 yrs (37-64 yrs)	43.53 yrs (33-57 yrs)	.572	.635

Frequencies and Chi Square Results for Stage Pattern Phase 2-Phase 3

Demographic Variable	Stable Active (n=20)	Stable Inactive (n=20)	Progressor (n=16)	Regressor (n=9)	χ^2 (df=3)	p
Gender					3.385	.336
Male	2	2	2	3		
Female	18	18	14	6		
Employed Full-Time	16	11	9	7	4.068	.254
Employed Part-Time	4	5	4	2	.185	.980
Relief Employee	0	4	3	0	6.334	.096
Shiftwork						
Days	5	6	7	4	11.439	.076
Evenings	4	5	4	1	1.984	.576
Nights	3	6	4	1	.862	.835
Rotating Shifts	2	1	1	1	2.046	.563
<12 hours	5	11	6	6	.549	.908
>12 hours	2	4	5	1	3.657	.301
Occupational Classification						
Support	1	2	1	2	3.339	.342
Paramedical	9	2	5	3	1.934	.586
Nurse	7	13	9	3	6.084	.108
Management	2	2	0	1	4.836	.184
Other	0	1	1	1	1.781	.619

Average Age, Age Ranges, and ANOVA Results

	Stage Pattern Group				F_(3,64)	p
	Stable Actives	Stable Inactives	Progressors	Regressor		
Age (Average & Range)	43.40 yrs (36-63 yrs)	45.60 yrs (33-57 yrs)	41.60 yrs (36-57 yrs)	46.89 yrs (41-55 yrs)	1.797	.158

APPENDIX U
Process Use for Stable Inactive, Progressor & Regressor Groups
for Phase 1 – Phase 2 and Phase 2 – Phase 3 Transitions
Means & Standard Deviations

Process	Phase 1- Phase 2		Phase 2 – Phase 3	
<i>Stable Inactives</i>				
<i>Experiential Processes</i>				
Consciousness Raising	2.50	2.49	2.58	2.57
	(.73)	(.77)	(.75)	(.93)
Dramatic Relief	2.02	2.16	2.18	2.37
	(.82)	(.85)	(.93)	(1.10)
Environmental Reevaluation	2.61	2.51	2.68	2.78
	(.85)	(.90)	(.86)	(1.01)
Social Liberation	2.81	2.80	2.77	2.86
	(.68)	(.75)	(.58)	(.77)
Self Reevaluation	2.91	2.76	2.97	3.06
	(.97)	(.93)	(1.02)	(1.09)
<i>Behavioral Processes</i>				
Counterconditioning	2.43	2.29	2.26	2.40
	(.76)	(.66)	(.64)	(.82)
Helping Relationships	1.86	1.79	1.85	1.88
	(.84)	(.72)	(.78)	(.93)
Reinforcement Management	2.62	2.48	2.55	2.58
	(.88)	(.78)	(.84)	(.86)
Stimulus Control	1.95	1.90	1.98	1.92
	(.65)	(.69)	(.87)	(.75)
Self Liberation	3.12	3.06	3.10	3.13
	(.81)	(.69)	(.65)	(.86)

Process	Phase 1- Phase 2		Phase 2 – Phase 3	
	<i>Progressors</i>			
<i>Experiential Processes</i>				
Consciousness Raising	2.31 (.76)	2.33 (.65)	2.43 (.78)	2.34 (.98)
Dramatic Relief	2.16 (.80)	2.23 (.82)	2.37 (.81)	1.96 (.81)
Environmental Reevaluation	2.45 (.90)	2.63 (.93)	2.56 (.85)	2.15 (.76)
Social Liberation	2.67 (.80)	2.81 (.70)	2.70 (1.00)	2.79 (.99)
Self Reevaluation	2.91 (.98)	2.95 (1.07)	3.04 (.96)	2.45 (.89)
<i>Behavioral Processes</i>				
Counterconditioning	2.64 (.68)	2.83 (.73)	2.45 (.78)	2.71 (1.06)
Helping Relationships	1.98 (.89)	2.20 (.96)	1.95 (.87)	2.03 (.96)
Reinforcement Management	2.67 (.93)	2.75 (1.04)	2.53 (.76)	2.65 (.68)
Stimulus Control	1.86 (.50)	2.02 (.63)	1.76 (.45)	1.82 (.55)
Self Liberation	3.10 (.79)	3.32 (.80)	3.14 (.56)	3.40 (.74)

Process	Phase 1- Phase 2		Phase 2 – Phase 3	
	<i>Regressors</i>			
<i>Experiential Processes</i>				
Consciousness Raising	2.50	2.35	2.11	1.58
	(.75)	(.66)	(.37)	(.68)
Dramatic Relief	1.84	2.18	2.19	2.27
	(.79)	(.69)	(.71)	(.78)
Environmental Reevaluation	2.18	2.36	2.30	2.08
	(1.04)	(.94)	(.65)	(.70)
Social Liberation	2.51	2.31	2.69	2.50
	(.77)	(.73)	(.48)	(.76)
Self Reevaluation	2.71	1.15	2.75	2.58
	(1.15)	(1.03)	(.68)	(.75)
<i>Behavioral Processes</i>				
Counterconditioning	2.57	2.15	2.77	2.58
	(.97)	(.58)	(.63)	(.84)
Helping Relationships	1.98	1.88	1.63	1.72
	(1.09)	(.79)	(.76)	(.80)
Reinforcement Management	2.75	2.65	2.33	2.33
	(1.02)	(.90)	(1.02)	(1.03)
Stimulus Control	1.63	1.75	1.75	1.55
	(.44)	(.60)	(.17)	(.46)
Self Liberation	3.18	3.05	3.08	2.91
	(1.00)	(.70)	(.61)	(.94)