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EXCUSERCISE: DIFFERENTIATING THE RELAPSE STAGE OF EXERCISE BEHAVIOR CHANGE IN TERMS OF PERCEIVED BARRIERS, SELF-EFFICACY, AND MOTIVES VIA AN INTERNET BASED DATA COLLECTION

Author: (Please type)

Bruce S. Cohen

Date of Defense: (Please type)

August 5, 2003

Dissertation Examining Committee:(please type)	Read and Approved By:(Signatures)
Michael Sachs	
Dissertation Advisory Committee Chairperson	
Catherine C. Schifter	
Carole A. Oglesby	
Virginia M. Carter	
Emily Roper	
Examining Committee Chairperson	If Member of the Dissertation Examining Committee

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(Dean of the Graduate School)

EXCUSERCISE: DIFFERENTIATING THE RELAPSE STAGE OF EXERCISE BEHAVIOR CHANGE IN TERMS OF PERCEIVED BARRIERS, SELF-EFFICACY, AND MOTIVES VIA AN INTERNET BASED DATA COLLECTION

A Dissertation Proposal

Submitted to

the Temple University Graduate Board

In Partial Fulfillment

of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

By

Bruce S. Cohen

August, 2003

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ABSTRACT

EXCUSERCISE: DIFFERENTIATING THE RELAPSE STAGE OF EXERCISE BEHAVIOR CHANGE IN TERMS OF PERCEIVED BARRIERS, SELF-EFFICACY, AND MOTIVES VIA AN INTERNET BASED DATA COLLECTION

by Bruce Cohen

Doctor of Philosophy

Temple University, August, 2003

Major Advisor: Dr. Michael Sachs

The purpose of this study was to define the exercise relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives. Nine hundred and thirty-one participants from a sample of convenience responded to a 68-question Internet survey. Participants had a mean age of 37.4 (*SD* ± 12.9) years. Caucasians comprised 88.2% of respondents. Women comprised 62.4% of the sample. Fifty-three percent of respondents were married. Approximately 60% of respondents had no children. Participants tended to be highly educated.

Ninety-two participants were categorized into the relapse stage based on the ACSM definition of "regular exercise," the five stages of exercise change (Precontemplation, Contemplation, Preparation, Action and Maintenance) and the following Relapse stage of change definition: "I was exercising regularly at times over the past 12 months." "I am not currently exercising regularly." "I intend to resume exercising regularly in the future." The length of lapse from exercise averaged 4.03 months (*SD* ± 3.24 months) and occurred an average of 2.17 times (*SD* ± 1.36 times) during the past year.

A global score was calculated for barriers and self-efficacy. Then a 6 (Stages) by 4 (exercise decisional balance [Pros and Cons], self-efficacy, barriers, and motives) multiple analyses of variance (MANOVA) was calculated. Dunnett post-hoc tests were used to follow-up significant univariate effects. A similar MANOVA was calculated for exercise motivations.

Relapsers are closer to those individuals in the Preparation and Action stages of change in terms of self-efficacy, motives and barriers, rather than in the Contemplation stage of change. Self-efficacy is the determinant that best differentiates Relapsers from other

stages, particularly Maintainers. Increasing the use of behavioral processes along with the number of intrinsic motives (particularly enjoyment) for participation in exercise while simultaneously decreasing the number of personal mood affect and injury barriers may result in increased self-efficacy, reduced length of relapse, and better adherence to regular exercise.

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To my family, parents Joe and Harriet, and brother Marc, finally giving them a doctor in the family but more importantly "moving on to bigger and better things." I figured if I stayed in school long enough I would miss the "mid-life crisis." The reality is that staying in school is the crisis. Now I'll need even more of their support and love out in the real world.

To my good friends and friends of friends as well as colleagues and friends of colleagues and to all study participants - thank you for taking the time and energy to fill out the EXCUSERCISE survey. A special thanks to my colleague, Dr. Frank Perna, whose statistical and philosophical expertise is only outdone by his friendship.

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CHAPTER 1

INTRODUCTION

Background

Each New Year's Day millions of people commence their annual attempt at adopting an exercise program. Within 6 months, 50% have dropped out and have relapsed back into their sedentary lifestyle (Dishman, 1988). By year's end, the participation rate is back to the regular annual 20% compliance mark. One problem can be identified as starting, commencing, initiating, or adopting short-term physical activity or exercise. A subsequent problem lies in adhering, maintaining, or sticking to an exercise program over the long-term for the duration of a lifetime. Other challenges exist in developing identification and prevention techniques that limit lapses and relapses from physical activity, or exercise, back into sedentary lifestyle. How shall "physical activity," or "exercise," be defined? How shall "relapse," or "lapse," be defined? What are the characteristics of an exercise "Relapser" in terms of excuses or perceived barriers, exercise self-efficacy, decisional balance, and motives?

Physical Activity and Exercise

Exercise is a term commonly restricted to the subcategory of physical activity: physical activity that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is the objective (Casperson, Powell, & Christiansen, 1985). Exercise training is the systematic use of exercise of specific frequencies, intensities, and durations to attain a desired fitness effect. Exercise is an end unto itself, while physical activity is done for a number of purposes: occupational (sweep the floor), transportation (walk to work), and recreational or leisure time activity (basketball).

Comparison of physical activity and exercise research is complicated by ever-changing guidelines for frequency, duration, and intensity. According to the 1996 landmark Report on Physical Activity by the U.S. Surgeon General, since 1990, 22 differing statements professing standards or criteria for exercise, by 10 different National organizations, have been reported (United States Department of Health and Human Services [USDHHS], 1996. In 1995, the American College of Sports Medicine (ACSM) and Centers for Disease Control (CDC), modified its minimum physical

activity guidelines to include an increased cardiovascular component recommending an increase to 20 to 60 min per session (Pate et al., 1995). Although this latest recommendation may make it easier for non-exercisers to adopt and adhere to an exercise or physical activity program, it has and will create further difficulties when trying to compare exercise adherence studies.

The present study focused on the exercise domain. "Regular exercise" was defined as any planned or structured physical activity (e.g., brisk walking, group exercise class, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 times per week for 20 to 60 min per session. Exercise does not have to be painful to be effective but should be done at a level that increases breathing rate and causes one to break a sweat.

Lapse and Relapse

It helps to distinguish between a lapse, an isolated mistake or temporary slip, and a relapse, a complete setback (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). Marlatt and Gordon (1985) classified a slight slip as a "lapse," while a total, continuous, complete backsliding is classified as a "relapse."

Sallis and Hovell (1990) looked cross-sectionally at the patterns and determinants of the lifetime history of relapse from exercise in a San Diego, California community population. Subjects reported the number of times over their lifetime that they had exercised vigorously for at least 6 months and then stopped exercising for at least 3 months. Approximately 60% of the exercisers reported no lapses, 20% 1 to 2 relapses, and 20% reported 3 or more relapses. Injury was the most commonly reported reason for the last relapse. However, because little research into the area of lapse/relapse length or frequency in terms of exercise has been conducted, this study proposes to examine frequency rates and durations of relapse.

In 1995, the Canadian Fitness and Lifestyle Research Institute (CFLRI) added three relapse categories to the original five-stage Transtheoretical/Stages of Change model developed by Prochaska and DiClemente (1982), believing that people in relapse may well require different intervention strategies than people in other stages of change. For example, interventions for Contemplators deal with the adoption of physical activity, whereas interventions for people in Relapse need to consider the resumption of physical activity. Similarly, dropouts who

have been active in the past will likely need a very different intervention approach than Precontemplators (i.e., individuals who have no intention in exercising), who have been "historically sedentary."

The previously cited Canadian study (CFLRI, 1995) indicates where future research in this particular segment of the exercise adherence field is headed. Intervention strategies would be dependent upon relapse categorization. There would be different strategies for different types of exercise Relapsers.

The present cross-sectional study attempted to further describe characteristics and determinants (motives, excuses/barriers, lapse frequencies/durations, self-efficacy, decisional balance) of Relapsers that may differentiate a Relapse stage of readiness to exercise from other stages of change. For this study Relapse was defined as: "I was exercising regularly at times over the past 12 months." "I am not currently exercising regularly." "I intend to resume exercising regularly in the future."

Perceived Barriers and Excuses Not to Exercise

Many theories of behavior change include the conceptual element of perceived and/or real barriers that allegedly hinder, or deter, adherence and participation.

The Health Belief Model (Janz & Becker, 1984; Rosenstock, 1974) utilizes individuals' beliefs in perceived barriers to explain health behavior compliance. The likelihood of action depends upon whether an index of perceived susceptibility to disease or illness and barriers to target behavior is outweighed by an index of perceived benefits to preventative action.

Godin et al. (1994) suggests the definition of perceived barriers is related to "exercise interventions" found within perceived behavioral control, a concept set in theory of planned behavior of Ajzen (1985). An index of beliefs about requisite resources and beliefs about the power to control factors that facilitate or inhibit desired health behavior is at issue.

The Social Cognitive Theory and Self-Efficacy concept of Bandura (1977, 1986) differentiate between various barriers. One type of perceived barrier slows or stops health behaviors often involving personal (fatigue, injury) or situational (weather) factors. The second type of perceived barrier involves physical determinants (lack of facilities, exercise leader) that often prevent behavior initiatives.

The Transtheoretical Model of Behavior Change premise of Prochaska, Norcross, and DiClemente (1994) is that people go through various stages of change in adopting and maintaining a health behavior. This theory makes use of the Self-Efficacy model of Bandura (1977, 1986) as well as the decision-balance construct defined by Janis and Mann (1977) wherein instrumental costs to self and others are calculated quite similarly to perceived barriers.

Meichenbaum and Fong (1993) have developed a three-level framework for categorizing and studying reasons for non-adherence to exercise. Level I consists of evidence-based reasons. Level II reasons consist of self-relevant reasons that describe the individual's perceived costs and benefits of compliance with health-related advice. Factors such as perceived barriers, concerns about negative consequences, or low self-efficacy for implementing the recommended treatment regimen, explain why individuals cannot change their behavior. Level III reasons consist of affective-schema related reasons that reflect deeply rooted, often highly affectivity charged schema related beliefs and feelings that influence non-adherence decisions. Level III reasons include depression, fear, helplessness, fatalism, denial, and avoidance. Level I

interventions include educational programs. Level II interventions include strategies for starting and maintaining a program. Level III interventions target specific belief processes and rationalizations.

Meichenbaum and Fong (1993) have suggested that an assessment of reasons for noncompliance provide information for predicting relapse and for formulating individually tailored interventions. The educational component of the EXCUSERCISE website is designed to motivate individuals to start and maintain an exercise program by providing strategies to counter rationalizations in order to prevent or shorten relapse back into sedentary lifestyle.

Measurement of Perceived Barriers

The research on exercise barriers can be drawn along prospective and descriptive study lines. Retrospective studies tend to use recall procedures, thereby generalizing responses and minimizing the perceived behavioral control element that changes as a function of exercise experience. Descriptive studies typically ask for a generalized response without a focus on a specific time frame. To counter these measurement obstacles, participants can be asked about their exercise behavior during an upcoming specific time frame for a specific duration, or make use of

a limited seven day (one week) exercise recall. Retrospective recall studies, regardless of domain (leisure, health, or exercise) typically ask participants about barriers they encounter by using an elicitation procedure or identification rating procedure to an investigator provided list. Frequency analysis is conducted to determine the most common specific barriers. Information on the relative strength of barrier and frequency of occurrence within a given time frame has not often been researched. (Brawley, Martin, & Gyurcsik, 1998)

Another descriptive method consists of: (a) providing a list of previously reported barriers and querying participants as to the degree of agreement about influence or hindrance, (b) ease or difficulty of an action in the presence of the barrier, (c) degree of limitation to following a prescription or action, (d) likelihood that the barrier would hamper or hinder performance, (e) degree of concern about the potential barrier, and (f) degree of agreement the barrier existed. This quantifiable response can be used to measure perceived behavioral control - predicting intentions as proposed in the Theory of Planned Behavior. (Brawley et al., 1998).

Motivations to Exercise

Most theories about incentives or motivations to exercise center on a personal, situational, or interactional approach. Personal approaches see motivation as an individual enduring trait. Theories or models such as Self-Motivation (Dishman & Icke, 1981), Locus of Control McCready & Long, 1985), and Self-Determination Theory (Deci & Ryan, 1985, 1990) are examples of personal approaches. Situational approaches indicate that environmental factors are the major determinants of motivation as evidenced by the use of contracts (Wysocki, Hall, Iwata, & Riordan, 1979) and rewards (Keefe & Blumenthal, 1980). The interaction approach uses both personal and environmental criteria and is evidenced in the Personal Investment Theory of (Maehr & Braskamp, 1986).

In a study combining the theory of Self-Determination (intrinsic/extrinsic) with the Transtheoretical Model (stages of change), Ingledew, Markland, and Medley (1998) concluded that extrinsic (specifically bodily) motives dominate during the early stages of exercise adoption, but that intrinsic (specifically enjoyment) motives are important for progression to and maintenance of actual activity. In

fact, the extrinsic (bodily) benefits are still important for individuals in the Action stage of change. Different motives for participation in exercise, particularly across the Relapse stage of change, were examined in this study.

Transtheoretical Model/Stages of Change

The typical path of exercise behavior change usually involves slips backward, or regressions, and according to the Transtheoretical/Stages of Change Model, has been described as a spiral (non-linear) pathway (Prochaska, Norcross et al., 1994). When an individual slips, lapses, or relapses to an earlier developmental stage of readiness to change, all is not lost, because future progression may occur more quickly due to insights and experience gained in earlier stages of change. Individuals may better understand how progress toward change occurs even in the absence of action. Gaining awareness about ones self, experiencing the emotions that awareness of the problem may trigger, and changing beliefs, attitudes, and thoughts constitute progress.

In the Transtheoretical Model, three factors are hypothesized to mediate the change process. These three factors are: (a) an individual's belief or self-efficacy for change, (b) the decisional balance of perceived

advantages and disadvantages of change, and (c) the strategies and techniques (the processes of change) individuals use to modify their thoughts, feelings, and behavior (Prochaska, Norcross et al., 1994).

Self-efficacy originates from Bandura's Social cognitive theory. Self-efficacy is the confidence an individual has in his/her ability to perform a behavior in challenging or tempting situations. Consistent positive relations between exercise self-efficacy and stage of change have been shown. In fact, the higher the self-efficacy the more advanced the stage of change. Self-efficacy (Bandura, 1977) conceptualizes a person's perceived ability to perform on a task as a mediator of performance on future tasks. A change in the level of self-efficacy can predict a lasting change in behavior if there are adequate incentives and skills.

Behavior change is assumed to involve a systematic evaluation of the potential gains (Pros) and losses (Cons) associated with a particular new behavior. Janis and Mann (1977) conceptualized decision-making as a decisional "balance sheet" of comparative potential gains and losses. The balance between the Pros and Cons varies depending on which stage of change the individual is in. Pros of change

for physical activity increase across the stages and often peak in the Action stage of change. Cons usually decrease with advancing stages of change.

The Transtheoretical Model treats behavior change as a dynamic process where individuals move through a series of stages or readiness to change before particular behavior adoption occurs. In reference to exercise, five stages of change have been proposed in accordance with an individual's intention and behavior: Precontemplation (no intention of becoming physically active), Contemplation (thinking about starting to become physically active within the next 6 months), Preparation (making small changes in behavior but still not meeting the criteria for regular physical activity), Action (meeting the criteria of regular physical activity, but only recently - usually within the past 6 months), and Maintenance (meeting a criterion for physical activity for 6 months or longer). Progress through these stages does not occur in a linear fashion but rather cyclical in nature as individuals progress and regress over time (Marcus, Rossi, Selby, Niaura,& Abrhams, 1992).

Originally developed for smoking addiction - a negative behavior, the Transtheoretical model had six

stages, the last being Termination - or cessation of smoking (Prochaska & DiClemente, 1982). When used for voluntary positive behavior like exercise, subsequent model adaptations eliminated the termination stage (Marcus & Simkin, 1994; Prochaska & Marcus, 1994). One could argue that the termination of sedentary behavior would be exercising. The reintroduction of a sixth stage entitled "Relapse" attempts to capture those individuals who have temporarily fallen between the cracks of the other five stages of change. What differentiates this stage from the others was the focus of this study. The Stages of Change model (Prochaska & Marcus) has been used in many different health promotion arenas and now has made its way into different types of data collection as evidenced by its use in electronic mail based data collection.

E-Based Data Collection

Mehta and Sivadas (1995) found that e-mail surveys produced quicker return rates, higher quality data (i.e., fewer missing fields), saved considerable time, effort, and financial resources than would have been required to send and return surveys through regular postal mail. Stanton (1998) concluded that questionnaire data collected via the Internet compared favorably with standard paper-and-pencil

administration. Stanton noted the importance of how much more convenient Internet administration was compared to standard protocols. He also reported that Internet data contained fewer missing fields, greater item variability, and similar scale structure compared to paper-and-pencil data. Stanton demonstrated that conducting psychological assessments in the form of questionnaires via a web page would not negatively affect the quality of data (i.e., structure and reliability of the scale, missing responses). Rather, the Internet may actually provide benefits related to convenience and quality of data.

It is recognized that when studies integrate electronic media into their design, they are immediately limiting their samples to those who have convenient access. With the rapid development and proliferation of Internet technology, though, it appears that there will only be greater and greater numbers of individuals who "seek help" on the Internet.

Zizzi and Perna (2002) integrated counseling service with electronic media. They examined the interaction of traditional and electronic contact methods with the stages of change model in a brief sport psychology counseling intervention. Overall results suggested that electronic

contact methods are at least equal to, and in several cases superior to, traditional contact methods regarding generating interest and requests for service from athletes. The main practical implications for sport psychology consultants were addressed and future directions for Transtheoretical and alternative media research in applied sport psychology were explored.

Prentiss Price (Chamberlin, 2000) developed the AllAboutDepression.com Internet web site and information survey designed to help researchers and practitioners better understand what it is that people want to know about depression. The majority of the web site provided excellent educational information on depression. There was a survey section that a web surfer can enter to take the research survey designed for her dissertation. The survey asked what information individuals were looking for in relation to the topic of depression and how the web site could be better arranged to serve this purpose.

Need for the Study

For decades exercise physiologists and behavior specialists have placed individuals on state of the art fitness equipment and scientifically sound programs, only to watch these individuals falter in their attempt to

adhere to an exercise program. Although effective, the cost of one-on-one attention is high in terms of monetary and staffing resources. The psychosocial issues seen in perceived barriers are key in solving the dilemma. A voluntary human health behavior, like exercise, is a complex, ever-changing system that requires flexible program development. No one model can explain all individuals' behavior. The leading candidate, the Transtheoretical model, provides a useful framework whereby changes and processes can be identified that allow for the development of initial exercise adoption into long-term adherence.

Approximately 20% of the U.S. population participates in exercise or physical activity at levels sufficient to generate the health benefits that health professionals claim are obtainable. Increasing exercise adherence rates will necessitate deeper exploration into the psychosocial connection to the physical activity arena. It is through better personal strategy development designed to counter sedentary lifestyles that improvements in exercise, physical activity rates and health will be realized.

Statement of the Problem

The purpose of this study was to define the exercise Relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population.

Hypotheses

The following hypotheses were examined in this study:

1. People who relapse from exercise back into sedentary lifestyle have different determinants (perceived barriers, self-efficacy, decisional balance, and motives) from people at other stages of exercise behavior change.

2. People who relapse from exercise back into sedentary lifestyle have differing motives for exercise participation compared to people at other stages of change.

3. People who relapse from exercise back into sedentary lifestyle have differing levels of self-efficacy compared to people at other stages of change.

4. People who relapse from exercise back into sedentary lifestyle have differing excuses or barriers compared to people at other stages of change.

Delimitations

The scope of this study was delimited in the following ways:

1. Participants were consenting male and female volunteers aged 18 and above.

2. Participants must have had access to a computer and the Internet.

3. All behavioral and demographic data was collected using a self-administered survey.

4. The self-administered survey was located on the EXCUSERCISE.org web site.

5. The survey response was presumed to provide an accurate representation of the participant's actual exercise-efficacy as measured by the Self-Efficacy for Behavior Scale (Marcus, Selby, Niaura, & Rossi, 1992).

6. The survey response was presumed to provide an accurate representation of the participant's actual perceived barriers or excuses to exercise as measured by a list based on the checklist utilized in the 1995 CFLRI Stages of Change in Exercise study.

7. The survey response was presumed to provide an accurate representation of the participant's actual exercise motives using the Markland and Ingledew (1997) abbreviated version of the Exercise Motivations Inventory, the Exercise Motivations Inventory-2.

8. This study focused attention primarily on the Relapse stage of exercise behavior change.

Limitations

The scope of this study was limited in the following ways:

1. Participants' responses were assumed to be honest.

2. All participants were assumed to understand the written directions on each survey instrument.

3. It was assumed that all participants understood the definition of regular exercise.

4. It is acknowledged that the level or intensity of participant's exercise was not controlled.

5. It is acknowledged that mode or type of participant's exercise was not controlled.

6. It is acknowledged that participant's experience, level of confidence or expertise, or familiarization with the Internet or computers was not controlled.

7. The nonrandom sample or sample of convenience was limited to participants with access to the Internet.

8. No attempt was made to control for a skewed representation in relation to age, gender and ethnicity.

Conceptual and Operational Definitions

Adherence. The term adherence generally refers to the level of participation achieved in a behavioral regimen once the individual has agreed to undertake it, on their own volition. Adherence to exercise is most often defined for research purposes as a percentage of attendance. An example of this is offered by Gale, Eckoff, Mogel, and Rodnick (1984). Subjects who attended less than 10% of exercise sessions were classified as early dropouts, 10 to 49% were considered to be nonadherers, and subjects attending 50% or more sessions were considered adherers. Statistics from a number of adherence studies indicate that about 50% of the individuals who start a fitness campaign will drop out in six months or less (Dishman, 1988; Shephard & Cox, 1980).

Decisional Balance. Based on a conflict model of decision making (Janis & Mann, 1977), behavior change is assumed to involve a systematic evaluation of the potential gains (Pros) and losses (Cons) associated with the new behavior. Pros generally increase across Stages of Change, while Cons decrease.

Dropout. The term dropout refers to clients/patients who have been active for a time and then have quit their

exercise program/regime. Most of the information on dropouts comes out of the cardiac rehabilitation field. A distinction is often made regarding the time of involvement: subjects who participated for 2 months or less and then dropped out (Shephard & Cox, 1980) or subjects who miss more than 2 consecutive weeks of sessions for reasons other than sickness, travel, or injury (Ward & Morgan, 1984). Study definitions of dropout are often quite specific, such as not attending a single supervised session for 8 weeks for reasons other than myocardial infarction or death (Oldridge, 1979). Some studies are more general: stopped attending the program prior to the completion of the 1-year prescribed treatment regimen (Blumenthal, Williams, Wallace, Williams, & Needles, 1982).

Compliance. Another term to come out of the cardiac rehabilitation field is compliance. Compliance has been defined as the degree to which subjects adhere to a protocol or treatment (Oldridge, 1979). Oldridge (1988) later differentiated between the terms adherence and compliance by utilizing compliance to describe behaviors related to following immediate or short-term health and medical advice and direct prescription to relieve symptomatology and using adherence in reference to

long-term behavioral changes associated with ameliorating or preventing symptomatology. Compliance as a sense of coercive obedience to orders and adherence as negotiated agreement (Hindi-Alexander & Throm, 1987) provide denotation alluding to exercise forced upon an individual for reasons of medical/health, Fit for Duty, or insurance requirement.

EXCUSERCISE. The (ir)rational, yet real, psychological, sociological, physiological, environmental, or spiritual barriers/reasons/excuses individuals employ to avoid participation in unstructured physical activity or structured exercise.

Exercise. Exercise is a term commonly restricted to the subcategory of physical activity: physical activity that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is the objective (Casperson et al., 1985). Exercise training is the systematic use of exercise of specific frequencies, intensities, and durations to attain a desired fitness effect.

Exercise Barriers. Physical, social, psychological, and emotional determinants that lead to the cessation of exercise and lapse or relapse into sedentary lifestyle, as

measured by the checklist utilized in the 1995 CFLRI Stages of Change in Exercise study. This checklist represents the most widely used and validated scale measuring exercise program or cessation.

Exercise Motives. Physical, social, psychological and emotional reasons why individuals may or do participate in exercise. Markland and Hardy (1993) developed the Exercise Motivation Inventory (Exercise Motivations Inventory) and Markland and Ingledew (1997) developed the modified form of the assessment, the Exercise Motivations Inventory-2, to assess exercise motives. The checklist used for this study is associated with the list generated by the Exercise Motivations Inventory-2, but was abbreviated to limit the length of the questionnaire. The Exercise Motivations Inventory-2 represents the most widely used and validated scale measuring participation reasons.

Lapse. A slip or miss of a planned exercise session.

Physical Activity. Physical activity is defined as: bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal or resting level (Casperson et al., 1985). Physical activity can vary in intensity, duration, and pattern of intensity by duration, frequency, and muscle group used. Because the

aspects of physical activity captured by the physiological (e.g., units of energy expenditure) and behavioral sciences (playing of games, sports and leisure pursuits) are different, correlations between the different indicators on health framework has recently dominated classifications of behavior aspects of physical activity (e.g., sessions of aerobic activity.) Physical fitness usually has been viewed as a multifactorial trait related to the capacity for movement.

Regular Exercise. Any planned or structured physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 times per week for 20 to 60 min per session. Exercise does not have to be painful to be effective but should be done at a level that increases breathing rate and causes the individual to sweat. The 1990 regular exercise definition for this study was considered to be moderate to vigorous exercise by the ACSM. (Pate et al., 1995).

Relapse. A total, continuous, and complete backsliding from regular exercise (Active, or Maintenance stages of Transtheoretical or Stages of Change Model) back into sedentary life. For the survey section of this study

relapse was defined in the following manner: "I was exercising regularly at times over the past 12 months." "I am not currently exercising regularly." "I intend to resume exercising regularly in the future." This was measured by the Canadian Fitness and Lifestyle Research Institute's 1995 study on stages of change in exercise which was based on Stages of Exercise Behavior Change (Marcus, Selby, et al., 1992). The Stages of Exercise Behavior Change is a widely used and validated measure of an individual's progress in terms of readiness for exercise participation.

Self-Efficacy. Self-Efficacy originates from the Social Cognitive Theory of Bandura (1977). Self-efficacy is the confidence an individual has in his/her ability to perform a behavior in challenging or tempting situations, as measured by Self-Efficacy for Exercise Behavior Scale of Marcus, Selby et al. (1992). The Self-Efficacy for Exercise Behavior Scale is a widely used and well-validated measure of participants' confidence in their ability to persist with regular exercise under various impediments.

Transtheoretical Model of Behavior Change/Stages of Change). Known as the Stages of Change Model (Prochaska and DiClemente, 1982). The theory was modified to

incorporate the voluntary health behavior of exercise and is also known as the Stages of Exercise Behavior Change (Marcus, Shelby et al., 1992). The Transtheoretical Model/Stages of Change treats behavior change as a dynamic process where individuals move through a series of stages or readiness to change before particular behavior adoption occurs. Progress through these stages does not occur in a linear fashion but rather cyclical in nature as individual's progress and regress over time. The Stages of Exercise Behavior Change is a widely used and validated measure of an individual's progress in terms of readiness for exercise participation. Listed below are the Stages of Exercise Change sub-definitions employed for this study (includes 6th stage, that of Relapse).

1. I have not done any regular exercise for a long time, and I have no intention of starting to exercise regularly in the near future. (Precontemplation)

2. I have not been exercising regularly over the past 6 months. But I am thinking of doing so and intend to exercise regularly in the near future. (Contemplation)

3. I have not been exercising regularly over the past 6 months. But I am taking active steps to exercise regularly in the very near future. (Preparation)

4. I was exercising regularly at times over the past 12 months. I am not currently exercising regularly. I intend to resume exercising regularly in the future. (Relapse)

5. I have recently begun exercising regularly after a period of irregular, or not exercising over the past 6 months, and I intend to continue exercising regularly. (Action)

6. I have been exercising regularly for the past 6 months and I intend to continue exercising regularly. (Maintenance)

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this study was to define the exercise relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population. The review of literature chapter is presented in the following sections: (a) Behavior Change Models, (b) Barriers to Physical Activity/Exercise, (c) Assessment of Physical Activity/Exercise, (d) Physical Activity Trends, and (e) Physical Activity Recommendations.

Behavior Change Models

Many models and theories have been utilized in social science and behavioral research on physical activity. These approaches vary in their applicability as some models and theories were designed as guides to understanding behavior, while others were constructed with a view toward developing interventions.

Health Belief Model

As mentioned earlier when discussing the dropout/adherence terminology, early physical activity

participation rate research came from the cardiac rehabilitation arena. The Health Belief Model proposes that adherence with a recommendation for a risk-avoiding health behavior change depends on the perceived severity of the illness threat, the person's perception of vulnerability to illness/disability if no action is taken, and belief that the health effectiveness of the behavior outweighs barriers to making change (Rosenstock, 1974). The perception of exercise ability and number of barriers as well as perception of illness severity and the number of cures to exercise have been identified as Health Belief Model factors associated with adherence levels in cardiac populations. When combined with patient characteristics and health behaviors, such factors explained about 20% of the variance in behavior (Oldridge & Streiner, 1990). The use of perceived barriers has been shown to be a strong predictor of physical activity. The model was designed for risk-avoiding, not health promoting behaviors. Therein lies its limitation.

Theory of Reasoned Action

The Theory of Reasoned Action proposes that the relative importance of attitude and social norms is thought to vary depending on the situation, the individual, and the

behavior in question (Ajzen & Fishbein, 1980). A specific exercise prescription (i.e., time, place, and type of exercise) can predict behavior through their interaction with social norms. The mediator influencing exercise adherence is intention. Studies of free-living physical activity show weak results with respect to the validity of intentions for predicting physical activity. Intentions may be necessary but do not appear to be sufficient to induce physical activity participation. Physical activity history may be a more reliable predictor of current and future physical activity levels than is a statement of intentions to be active (Godin, Shephard, & Golantonio, 1986).

Theory of Planned Behavior

Ajzen (1985), co-author of the Theory of Reasoned Action, extended the theory by introducing the concept of control as a factor in predicting behavior. Control is concerned with the extent to which internal and external factors interfere with ones attempt to perform a behavior. This theory proposes that the strength of an attempt to perform a behavior interacts with ones degree of control to determine the likelihood of the behavior occurring. The more favorable the attitude and subjective norm toward

exercise and the greater the person's perceived control over factors affecting exercise participation, the stronger his or her intention to exercise would be. Early research is providing encouraging support for this model; its use in the exercise arena is yet to be tested.

Expectancy-Value Decision Theories

This family of theoretical models views behavior as a function of ones expectations of outcomes stemming from a behavior and the evaluation of these outcomes compared with outcomes of alternative actions. Studies evaluating such theories have shown them to be capable of predicting intention or interest in adopting free-living physical activity, while not as capable in predicting maintenance of participation in either free-living or supervised activity. The decision balance sheet by Hoyt and Janis (1975) evaluates expected or experienced benefits and costs of activity, which can be used by health professionals to actively reinforce positive outcomes and diminish negative expectations.

Social Learning/Social Cognitive Theories

The Social Learning and Social Cognitive theories stress the importance of people's ability to regulate their own behavior by setting goals, monitoring their progress

toward these goals and actively intervening to make their social or physical environments supportive of these goals. The power of modeling and observational learning are also emphasized. Self-efficacy, combined with outcome expectancies (belief that the behavior will lead to desired outcome), is hypothesized to be the critical mediator determining which behaviors are attempted and how hard people try to adopt the behavior before giving up. The theory further suggests that personal experience, vicarious experience, verbal persuasion, and ones physiological stage are, in declining importance, the means by which a person's efficacy expectations are formed and changed (Bandura, 1986). The use of goal setting, feedback, self-monitoring and self-reinforcement and other self-regulatory skills, along with self-efficacy, have shown positive associations in both clinical and health populations.

Personal Investment Theory

The interaction approach uses both personal and environmental criteria and is evidenced in Personal Investment Theory of (Maehr & Braskamp (1986). This theory states that the meaning of the situation will determine what persons will choose to do, or not do, based on their: (a) sense of self, (b) perceived options, and (c) personal

incentives. Four components make up sense of self: identity, self-reliance, goal directedness, and a sense of competence. The perceived options are either intrinsic (task and ego) or extrinsic (social and reward) in nature. Duda and Tappe (1988) have developed four different versions of the Personal Incentives for Exercise Questionnaire based on Personal Investment Theory. Their first version indicated that incentives were more predictive than sense of self and perceived option in terms of predicting present and future involvement in exercise.

Self-Determination Theory

The Self-Determination Theory of Deci and Ryan (1985, 1990) suggests that specific exercise motives can be either intrinsically (internal) or extrinsically (external) oriented. Intrinsic motives allow freedom from pressure and the positive experience of choice, which are more likely to foster long-term engagement. Extrinsic motives may lead to tension, pressure to perform, and a feeling of compulsion. When intrinsically motivated, participants engage in an activity primarily for enjoyment, challenge, skill improvement, and affiliation. Appearance

improvement, weight control, and social recognition reflect extrinsic motivations. (Duda & Tappe, 1989; Markland & Ingledew, 1997).

Researchers have shown that intrinsic reasons play a major role in long-term maintenance/adherence of exercise behavior (Wankel, 1985, 1993), suggesting that extrinsically oriented motives would be expected in early stages of exercise adoption. In a study combining the theory of Self-Determination (intrinsic/extrinsic) with the Transtheoretical Model (stages of change), Ingledew et al. (1998) concluded that extrinsic (specifically bodily) motives dominate during the early stages of exercise adoption, but that intrinsic (specifically enjoyment) motives are important for progression to and maintenance of actual activity. In fact, the extrinsic (bodily) benefits are still important for individuals in the Action stage of change.

Relapse Prevention Model

The theory of Relapse Prevention (Marlatt & Gordon, 1985) has its origin in alcohol and drug addiction research. Some researchers have used concepts of relapse prevention to help new exercisers anticipate problems with adherence. Factors that contribute to relapse include

negative emotional or physiologic states, limited coping skills, social pressure, interpersonal conflict, limited social support, low motivation, high-risk situations, and stress. Principles of relapse prevention include identifying high-risk situations for relapse (e.g., intermittent knee pain) and developing appropriate solutions (e.g., cycle and swim instead of high impact running). Helping people distinguish between a lapse (a few days of not participating in their planned activity) and a relapse (an extended period of not participating) is thought to improve adherence.

Knowing the factors that often precipitate a lapse or relapse may help people recognize where work is needed in their lives. Marlatt and Gordon (1985) and Prochaska, Norcross et al. (1994) found about 35% of substance abuse (alcohol, cigarettes, and drugs) and eating relapses occurred during periods of negative emotions, such as depression, anger, pressure, either being with people who engage in the negative behavior, or being verbally pressured to participate. Sixteen percent relapsed while having a conflict or argument with a spouse, relative, friend, or coworker. Ten percent felt the urge to relapse when experiencing isolation. Knowing when exercisers are

most often likely to relapse may help in developing appropriate relapse prevention strategies.

Relapse Prevention Therapy intervention strategies can be grouped into three categories: coping skills training, cognitive therapy, and lifestyle modifications (Marlatt & Gordon, 1985). Coping skills training strategies include both behavioral and cognitive techniques. Cognitive therapy procedures are designed to provide clients with ways to reframe their sedentary lifestyle and exercise habit change process. Mastery develops as learning experiences are expected and appropriate responses planned. Lifestyle modification strategies such as meditation and spiritual practices are designed to strengthen a client's overall coping capacity. One review of the research on relapse prevention (Irvin, Bowers, Dunn & Wang, 1999) suggested that individuals be trained to: (a) identify high risk situations, (b) improve ability to avoid and/or cope with such situations, (c) emphasize the positives associated with completing an exercise session, (d) plan for inevitable slips, (e) set flexible exercise maintenance rules, and (f) choose enjoyable exercise activities. The

companion web site of the present study has a section offering strategies to participants who often relapse from regular exercise.

The Transtheoretical Model/Stages of Change

The importance of understanding stages of exercise behavior (e.g., initial adoption, longer-term adherence or maintenance) in influencing participations rates can be found through the incorporation of the stages and processes of change. This model, originally proposed by Prochaska and DiClemente (1982), proposes that individuals generally move sequentially through five major stages of change: Precontemplation, Contemplation, Preparation, Action, and Maintenance in adopting a new behavior. Original studies conducted on smoking cessation and drug addiction also included a sixth stage entitled "Termination." The model also incorporates several other dimensions of behavior change, including decisional balance approaches, self-efficacy and relapse prevention. Instruments have been developed to assess the stages of exercise adoption, as well as self-efficacy and decision making related to exercise adoption. Additionally, cross-cultural examinations in the United States and Australia have documented the utility of the processes of change approach

for understanding exercise behavior (Marcus & Owen, 1992). The potential major contributions of the Transtheoretical Model/Stages of Change for increasing and maintaining physical activity lie in its consideration of the readiness of individuals for change and its capacity for helping health professionals tailor the use of different cognitive-behavioral and environmental strategies to the groups most likely to benefit from their use.

Three factors are believed to mediate the stages of change process. An individual's self-efficacy for change, the decisional balance of perceived advantages and disadvantages (Pros & Cons) of changing, and the strategies (relapse prevention techniques) or processes of changes individuals utilize to change their feelings, thoughts, and, eventually, their behavior. Marshall and Biddle (2001) summarized findings from empirical applications of the Transtheoretical Model/Stages of Change in the physical activity domain by using the quantitative method of meta-analysis. The authors concluded that there is now sufficient data to confirm that stage membership is associated with different levels of physical activity, self-efficacy, Pros and Cons, and processes of change.

They also suggest that future research should examine the moderators and mediators of stage transition.

Studies have shown a consistent positive relation between exercise self-efficacy and stage of change (Marcus, Selby, et al., 1992; Marcus & Simkin, 1994; Nigg & Courneya, 1998). In fact, higher efficacy is associated with higher or advancing stage of change (Marcus & Simkin; Prochaska & Marcus, 1994; Reed, 1999). Marcus and Simkins have shown that self-efficacy can successfully differentiate among individuals at most stages of change.

The concept of evaluating potential gains (Pros) and losses (Cons) associated with adopting a new behavior has its origins in the conflict model of decision-making of Janis and Mann (1977). Summaries (Buxton, Wyse, & Mercer, 1996; Reed, 1999) of narrative reviews in the physical activity area conclude that Pros of change generally increase across the stages of change.

The Transtheoretical Model/Stages of Change makes use of 10 basic processes of change that describe the strategies and techniques that individuals utilize to change their thoughts, feelings, and, eventually, behavior. These processes are experiential or cognitive and behavioral in nature. The five experiential processes

believed to be used more frequently during early stages of change are: consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation. The five behavioral processes are: counterconditioning, helping relationships, reinforcement management, self-liberation, and stimulus control (Prochaska, Norcross, et al., 1994). Although more studies in this area are warranted, the current study will not undertake any investigation of the processes of change.

The adoption of a physically active lifestyle occurs in stages; and movement through these stages is cyclical, involving a pattern of adoption, maintenance, relapse, and re-adoption over time. People in different stages of change often have different needs. Knowing where one is in the cycle is therefore invaluable for tailoring interventions to encourage future physical activity.

Original research with smokers focused on six stages of change, the last stage being the "termination" of the unhealthy behavior. In behavior research on exercise, the "termination" stage has been eliminated. One might argue that it is sedentary lifestyle that is being terminated. The CFLRI (1995) study recognized "relapse" as a stage of readiness for exercise behavior change. The researchers

looked at the stage of readiness for physical activity in more than 2,500 Canadians. Participants' past and present physical activity behavior patterns, as well as their future intentions to be active, were evaluated. The following descriptors help to provide an understanding of the Transtheoretical Model/Stages of Change as presented in the CFLRI study and modified for the current study.

1. Precontemplation. No intention to make changes. Denial of the problem. Blaming external factors.

2. Contemplation. Considering a change. Identifying advantages/disadvantages. Focusing on internal factors

3. Preparation. Deciding to change. Making small changes and significant changes.

4. Action. Setting goals. Developing an action plan. Seeking support. Monitoring progress. Obtaining rewards.

5. Maintenance. Sustaining the change over time. Using coping skills. Monitoring progress. Seeking support.

6. Lapse/Relapse. Returning to a previous stage of change. Anticipating problems. Planning for high risk situations. Learning from the lapse. Getting back on track.

In fact, the researchers in the 1995 CFLRI study on physical activity attempted to deconstruct relapse stage into several phases. The CFLRI added three relapse categories to the original five stage model developed by Prochaska and DiClemente (1982), believing that participants in relapse may well require different intervention strategies than people in other stages of change. The three categories were entitled, Relapse, Potential Relapse, and Dropout. One in six Canadians was found to be in the Relapse category. These individuals were active at some point in the last 12 months but were no longer active. They intended to resume activity in the foreseeable future. Few Canadians were in the Potential Relapse category, where participants were currently active now, but did not intend to continue their physical activity. Very few of the participants were in the Dropout category, where participants had ceased activity after being active in the last 12 months with no intention of being active again. The Canadian study above, indicated no significant results between Relapse categories perhaps due to the close similarities in stage definitions (CFLRI). The present study examined the single stage category of Relapse.

The researchers of the same 1995 CFLRI study examined the barriers experienced by participants in each stage of exercise. The relative importance of all barriers appears to decrease from Relapse to Action to Maintenance. This is particularly apparent for barriers related to the physical and social environment, such as lack of a partner, lack or support from family and friends, lack of safe places, lack of facilities, and lack of child care. Participants in the Maintenance stage of change perceive half as many moderate barriers as participants in earlier stages of change. Lack of energy and motivation are at the top of the list for all stages of change. Long-term illness or injury is a major barrier only for participants in the Precontemplation stage (CFLRI).

Lack of skill and feeling uncomfortable are seen as far more important by participants in Precontemplation and Preparation stages of change than by participants in Relapse or Action stages of change. Problems with transportation are significant for those participants in Precontemplation, being of relatively minor importance to individuals in other stages of change. Child care is not an issue for Precontemplators, who tend to be older, but it does rate as a moderate barrier for participants in the

other three stages of change. Other results will be highlighted in comparison analysis in the results section.

Knowing the barriers experienced by participants in each stage of exercise allows for strategies to counter or combat participant's relapse back into sedentary lifestyle. Combined with knowledge about self-efficacy, decisional balance, and motives, a battle plan can be developed to help participants move along to the next stage of readiness.

Barriers to Physical Activity/Exercise

Many behavior models and theories incorporate the use of real or perceived reasons why individuals are unable to adopt or adhere long-term to healthy behaviors, physical activity, and exercise in particular. Strategies to manage these reasons, constraints, barriers or excuses should be planned in order to prevent relapse back into a sedentary lifestyle. Many measurement difficulties limit the power, association, and predictiveness of barrier research.

Perceived Barriers

Jackson (1988) preferred the word constraints rather than barriers in order to encapsulate a greater range of explanations. Jackson summarized the various classifications/definitions of constraints as internal or

external to the individual; intrapersonal (preferential) or interpersonal (participation); intervening and antecedent: blocking (precluding) and inhibiting (slowly or making situational variable); and permanent and temporary.

The Health Belief Model (Janz & Becker, 1984; Rosenstock, 1974) utilizes individuals' beliefs in perceived barriers to explain health behavior compliance. The likelihood of action depends upon whether an index of perceived barriers to preventative action is outweighed by an index of perceived benefits to preventative action. Brawley and Rodgers (1993) remark that some of the barriers included in the index are not barriers per se. Conceptually they do not represent the construct assessed although they may be determinants of the construct.

Godin et al. (1994) suggests the definition of perceived barriers is related to exercise interventions in the perceived behavioral control concept set in Ajzen's (1985) theory of planned behavior. An index of beliefs about requisite resources and beliefs about the power to control factors that facilitate or inhibit desired health behavior is at issue.

The Social Cognitive Theory and Self-Efficacy Theory of Bandura (1977, 1986) differentiate between various

barriers. One type of perceived barrier slows or stops health behaviors often involving personal (fatigue, injury) or situational (weather) factors. The second type of perceived barriers involves physical determinants (lack of facilities, exercise leader), service or system barriers that often present behavior initiatives. Studies by DuCharme and Brawley (1995) found that efficacy for scheduling/strategies account for a significant variance in exercise attendance prediction when compared to past behavior or barrier efficacy.

The Transtheoretical Model/Stages of Change premise of Prochaska, Norcross, et al. (1994) is that people go through various stages of change in adopting and maintaining a health behavior. This theory makes use of the Self-Efficacy theory of Bandura (1977)as well as the decision-balance construct defined by Janis and Mann (1977) wherein instrumental costs to self and others are calculated quite similarly to perceived barriers.

Measurement of Perceived Barriers

The examination of exercise barriers and theories of Reasoned Action and Planned Behavior (Ajzen, 1985, 1991) along with the use of the Self-Efficacy theory (Banduar, 1977, 1986) and the Transtheoretical model (Prochaska &

DiCLemente, 1982; Prochaska, Norcross, et al., 1984) can be drawn along prospective and descriptive study lines. Non-prospective (retro) studies tend to use recall procedures, thereby generalizing responses and minimizing the perceived behavioral control element that changes as a function of exercise experience. Subjects can be asked *about their exercise behavior during an upcoming specific* time frame for a specific duration. Descriptive studies typically ask for a generalized response without a focus on a specific time frame.

Information on the strength of the barrier limitation as well as the frequency of occurrence within a given time frame is not often researched. Studies in leisure, health, or exercise, typically provide barriers via an elicitation procedure or answering questions to an investigator provided list. Frequency analysis is determined by the percent of people most often indicating specific barriers.

Another descriptive method consists of providing a list of previously reported barriers and querying subjects as to: (a) the degree of agreement about influence or hindrance, (b) ease or difficulty of an action in the presence of the barrier, (c) degree of limitation to following a prescription or action, (d) likelihood that the

barrier would hamper or limit, (e) degree of concern about the potential barrier, and (f) degree of agreement that the barrier existed (Brawley et al., 1998). This quantifiable response can be used to measure perceived behavioral control, possibly even predicting intentions. The present study used retrospective recall and quantified the strength of specific barriers through Likert scales as well as frequency of occurrence across differing stages of changes.

The nature and variability of leisure constraints were measured in a study by Mannell and Zuzanek's (1991) by utilizing the methodology of experience sampling. This prospective method allows for multiple data samples over time in an attempt to determine if constraints are stable or variable. Participants are electronically paged and then are quizzed as to barrier identification and degree of limitation at that very particular moment in time compared to previous pagings.

Barrier Study Measurement Problems

The following list of barrier study measurement problems is partially derived from Brawley et al. (1998).

1. Most descriptive studies rely on survey recall to collect data. The greater the amount of time that has

passed between behavior action and survey request recall, the more difficult it becomes to have memory recognize and label a constraint or barrier. Individuals will often rely on stereotypic responses along with attitudes or expectations in recollecting perceived barrier information. Examples of such responses would be generalized answers like "not enough time," or "too much to do."

2. The lack of consistent scaling of barrier indexes across studies is evident, as many different Likert scales have been utilized to estimate the magnitude/strength of influence a particular barrier or constraint had on participation. Many scales and questions are not time frame or action specific. It appears difficult to determine if survey respondents are asked to give excuses (attributions or reason), give a generalized response, or give an opinion, rather than query the degree to which any barriers restrict participation.

3. Difficult to conduct between study comparisons due to volume and diversity of barriers/constraints (behavioral, cognitive, environmental).

4. Differences in number and content of barrier items.

5. Variation in methods to develop list of barriers.

6. Assignment to data-driven criteria versus theoretical.

7. Inconsistent barrier conceptualization: Actual versus perceived; antecedents/consequences versus intervening; behaviorally validated versus excuses, reasons or attributions.

8. Variations in the demographics of samples.

Strength of Influence of Exercise Barriers

Some barriers may be very limiting but occur very infrequently, whereas other barriers may not be a strong limitation, but occur quite often. A measure weighted by the influence of both limitation and frequency may be more reflective of how perceived barriers actually influence activity. The few studies that have attempted this have shown mixed results. Godin et al. (1994) asked participants in various stages of activity levels whether their perceived barriers would hinder their exercise three times per week for the next 6 months. A scale of -3 unlikely to +3 likely fell on the negative side, indicating that the barriers did not hinder participants' activity.

Even prospective studies by Brawley and Rodgers (1993), unhindered by rosy memory recall, discerned no significant difference between exercise adherers and dropouts with respect to average amount of time they believed perceived obstacles would hinder their next three weeks of exercise participation. Perhaps participants are skewing their responses with optimistic bias.

Perceived Barriers as Excuses and Reasons

McAuley et al. (1990) suggested that barriers may be attributed excuses rather than real obstacles, barriers or causes. Reasons may be viewed as logical evidence based justifications. Meichenbaum and Fong (1993) state that reasons/excuses for non-adherence take root in attribution theory, stress coping, and self-presentation. Excuses allow us to: (a)control distressing feelings (anxiety, depression), (b) protect our view of ourselves (self-esteem protection or maintenance), and (c) influence others in personal interactions (impression management).

Kendzierski and Johnson (1993) developed the Exercise Thoughts Questionnaire to assess the frequency with which individuals have thoughts involving reasons or excuses for not exercising at the present time. The items are similar to perceived barrier scales. The difference in results can

be attributed to the fact that indicated constraints did not prevent individuals from actually participating in their exercise. This theory development speaks to the importance of determining an individual's intentions to exercise (frequency, intensity, time) and the frequency with which an impediment actually prevents exercise, before labeling that impediment as a barrier and targeting it for intervention. "Lack of time" is an over-utilized term that can be generalized to indicate no genuine intention or desire to exercise. For those with a true intention to exercise, time constraints may represent a real barrier.

Meichenbaum and Fong (1993) have developed a framework for categorizing and studying perceived barriers and reasons for non-adherence to exercise. The three level coding system for classifying the reasons/excuses are: Level I - evidence-based reasons, evidence relating to health-related advice. Level II - reasons consist of self-relevant reasons; describing the individual's perceived costs and benefits of compliance with health-related advice; and factors that explain why the individual cannot change his/her behavior, such as perceived barriers, concerns about negative consequences, or low self-efficacy for implementing the recommended treatment regimen. Level

III reasons consist of affective-schema related reasons that reflect deeply rooted, often highly affectively charged schema related beliefs and feelings that influence non-adherence decisions. These reasons include: (a) expressions of dysphoric feelings (depression, fear), (b) negative models of the world and the self as victim (helplessness, fatalism, (c) denial and avoidance, and (d) arguments of free will.

Level I interventions include educational programs; Level II programs include strategies for starting and maintaining a program. Level III interventions target specific belief processes and rationalizations. Meichenbaum and Fong (1993) have suggested that an assessment of reasons for noncompliance provides information for predicting relapse and for formulating individually tailored interventions.

Detecting Excuses/Reasons

By using three level coding system of Michenbaum and Fong (1993), the vast majority of published barriers may be classified as self-relevant or Level II reasons for not adhering to healthy behaviors. The complexity of the voluntary health behavior of exercise leaves it susceptible to increased excuse making compared to simpler health

behaviors like pill taking or teeth brushing. Brawley et al. (1998) believe the narrative coding system may help uncover different levels of reasoning that characterize adaptive and maladaptive approaches to justifying non-adherence. The system could also be used to examine different groups of people. They believe that individuals with many or severely limiting Level III reasons - distortions of reality, will be most resistant to persuasion to change.

Brawley et al. (1998) also contend that previous barriers/reasons studies have been confounded by moderating factors such as: (a) risk associated with exercise or with the reason for exercise (thereby eliciting increased excuses), (b) number of previous exercise attempts and failures (thereby providing often used excuses), (c) complexity of exercise as an independent leisure activity or as part of a complex lifestyle-change package advocated for reduced disease risk (thereby increasing the probability for lapses and increased excuse making, and (d) demand characters of barriers assessment. This classification system may help to clarify reasons for noninvolvement and non-adherence to exercise by offering

respondents opportunity to expand response methods, thus providing more data to aid with identification of reasons.

Brawley et al. (1998) initial use of the Exercise Thoughts Questionnaire with motivated exercises (self-selected to enroll in programs) did not support reduced participation in those individuals who expressed their excuses/reasons more frequently, intending to exercise less. The authors also believe that further research into the attribution desirability of achieving disease prevention (must do activity) versus participating for health promotion (want to do activity) may provide greater insight into the psychological function served by making excuses/reasons. Perhaps a look at excuses/reasons in terms of individual's exercise motives would shed light on how to further gear interventions toward those intrinsically or extrinsically motivated, and the difference between those who enjoy exercise versus those who are only participating for health purposes.

Assessment of Physical Activity/Exercise

Traditional Measurement Tools

Self-report surveys, such as diaries, logs, recall questionnaires and quantitative histories are measuring tools that have been used in traditional epidemiological

research. The popularity of physical activity surveys exists because they are very practical for physical activity assessment in large population studies and are low cost relative to the wealth of information provided. Diaries generally provide a very detailed accounting of virtually all physical activity performed, normally with a time frame of one day. Because diaries are commonly limited to spans of 1 to 3 days, they may not represent long-term physical activity patterns.

Physical activity logs are basically an ongoing record of participation in certain types of physical activity. Logs can be useful for recording participation in an exercise-training program but, as with diaries, their use may itself influence the participant's behavior.

Recall surveys are less likely to influence behavior and generally require less respondent effort than either diaries or logs. The greatest effort is in remembering details of prior physical activity participation. Recall surveys have been used for measurements of 1 week, 1 month, 1 year, and even for lifetime physical activity. Retrospective Quantitative Histories (Minnesota Leisure-Time Physical Activity Questionnaire and the

Tecumseh Questionnaire) generally require specific detail for time frames of up to one year (Haskell et al., 1994).

More scientific and clinical methods for assessing physical activity levels include motion detection devices and heart rate monitoring. Currently, heart rate or motion sensors are not suitable for epidemiological investigation with representative population samples as the number of units needed to complete a large-scale investigation in a reasonable time frame would render the prospective study cost prohibitive. The summary index from these self-report surveys tends to be a kilocalorie score derived by adding the products of time spent in a given activity by either a previously measured or estimated rate of energy expenditure for that activity (Haskell et al., 1994).

Comparing estimates from different surveys is difficult. Factors such as survey and sampling methodologies may account for most of the differences. Such is the case with energy expenditure estimates, which are derived from the summation of frequency, duration, and intensity parameters for individual activities.

One advantage for the use of a scoring system that identifies patterns of physical activity is that estimates from different surveys using this type of system are

comparable. Comparing the 1985 National Health Interview Survey data and 1986 Behavioral Risk Factor Surveillance System data which are scored similarly, the estimates of activity are nearly identical across surveys for people classified as physically inactive; irregularly active; regularly active, not intensive; and regularly active, intensive (USDHHS, 1996). This achievement is remarkable because the two data systems have dissimilar survey items, methods of probing, and modes of survey administration.

The Behavioral Risk Factor Surveillance System, first implemented in 1981 (USDHHS, 1996), serves as a state-based monitoring system providing timely prevalence estimates of health behaviors linked to premature death among adults in the United States. The Behavioral Risk Factor Surveillance System (USDHHS) employs a telephone-administered questionnaire jointly developed by state health departments and the CDC. A random-digit-dialing process, using a multistage cluster sampling of noncommercial telephone numbers, initiates sample identification. The number of persons composing each unique 26-state sample increased each year from 34,439 persons in 1986 to 48,689 persons in 1990. The Behavioral Risk Factor Surveillance System employed virtually the same survey, sampling, and

interviewing methods during the five years of monitoring, and the same 26 states were utilized. The final scoring system for activity levels included four elements: (a) the self-reported frequencies and durations of the two leisure time physical activities the respondents spent the most time doing during the preceding month, (b) the activities' intensities, (c) whether the activities involved the rhythmic contraction of large muscle groups, and (d) an estimate of the percentage of the respondent's maximal cardiorespiratory capacity used during the activities (Casperson & Merritt, 1995).

The scoring system produced four activity patterns: (a) physically inactive (no leisure time physical activity), (b) irregularly active (activity performed less than 3 times per week, < 20 min per occasion, or both), (c) regularly active, not intensive (> or = 3 times per week, > or = to 20 min per occasion, and, below 60% of maximal cardiorespiratory capacity), and (d) regularly active, intensive (> or + to 3 times per week, > or = to 20 min per occasion, > or = 60% of maximal cardiorespiratory capacity, and rhythmically contracting, large muscle groups).

The first pattern can be used to estimate the Healthy People 2000 objective to reduce the incidence of no leisure

time physical activity, while the fourth pattern was designed to estimate the 1990 objective to increase regular, vigorous exercise (United States Public Health Service [USPHS], 1990). Briefly, the results indicated that roughly 6 in 10 persons were physically inactive or irregularly active. While almost 4 in 10 persons were regularly active, less than 1 in 10 were regularly active, intensive. There were statistically significant deceases in physically inactive persons and significant increases in persons classified as regularly active, intensive. The irregularly active pattern did not change, while only men of all ages and men less than 30 years of age increased the regularly active, not intensive pattern. Improvements across the activity patterns varied by demographic group: women and older adults made the most beneficial changes, while races other than white and the least educated groups had unfavorable changes. Despite many improvements, most persons still did little or no physical activity, signaling the need for enhanced intervention efforts. (Casperson & Merritt, 1995).

Use of Electronic and Alternative Media in Interventions

The traditional use of surveys, diaries, logs, and questionnaires for physical activity/exercise research has

been accomplished in person, or through the postal mail. The term, alternative media, has been applied to intervention research to describe computer-assisted or phone-based programs as opposed to describing standard, talk therapy models. The purpose of using these alternative media in facilitating previously existing interventions has been to save time and effort while still maintaining semi-personal contact with clients and participants. Most of the existent research has provided evidence that, in general, alternative media are effective in facilitating assessment and interventions in psychology based on measures such as abstinence rates and treatment effectiveness (Butcher, Keller, & Bacon, 1985; Newman, Consoli, & Taylor, 1997). Specifically, successful attempts have been made in incorporating alternative media in areas such as career counseling (Stevens & Lundberg, 1998), family therapy (King, Engi, & Poulos, 1998), behavior disorders (Fitzgerald & Werner, 1996), and smoking cessation (Burling et al., 1989; Schneider, Schwartz, & Fast, 1995). Further research has shown that up to 85% of individuals may express a preference for computerized administration of psychological assessments over paper-and-pencil methods (Lukin, Dowd, Plake, & Kraft, 1985), and

that these two forms of assessment are not different in their means, measures of variability, or reliability (Wilson, Genco, & Yager, 1985). Given this research, it is not surprising, for instance, that most of the achievement testing protocols (i.e., SAT, GRE) are moving towards a standard, computerized administration format.

The aforementioned research deals primarily with computer-assisted assessment, but does not truly address the topic of electronic services such as email and web-based services. Even though much of the following research is relatively new, the conclusions still provide reasonable direction for developing effective methods and hypotheses for research. Recent research by Mehta and Sivades (1995) compared the response rates and content of mail versus electronic mail surveys, finding that email surveys produced quicker return rates, more quality data (i.e., fewer missing fields), and saved considerable time, effort, and financial resources that would have been required to send and return regular mail.

Stanton (1998) supported the results of Mehta and Sivadas (1995) by demonstrating that questionnaire data collected via the Internet compares quite well with standard paper-and-pencil administration. Stanton also

highlighted the importance of how much more convenient Internet administration is compared to standard protocols; and he reported that Internet data contained fewer missing fields, greater item variability, and similar scale structure to paper-and-pencil data. Based on this research, it appears quite reasonable to assume that conducting psychological assessments in the form of questionnaires via a web page will not detrimentally affect the quality of data (i.e., structure and reliability of the scale, missing responses) and may provide benefits related to convenience and quality of data. Additionally, these benefits may carry over into any web-based assessments used within the context of intervention research.

Schmidt (1997) concluded that there are many benefits to publishing your survey on the world-wide-web. Perhaps the most notable and obvious benefit is access to a large population of individuals. Other benefits include savings in both time and money for survey researchers, and the ability to present survey information in formats that were previously difficult to achieve. Schmidt also believes that the dynamic and interactive surveys increase respondent motivation. Potential problems associated with missed opportunity, missing data, unacceptable and

incorrect data, duplicate data and security issues can be avoided or minimized with an appropriately written Common Gateway Interface software program. The age old sampling problem exists for web surveying. Although demographics are rapidly changing, the average web users are primarily males in their late teens or early thirties, with an above average socio-economic status and education level. As is true of all surveys, generalized conclusions should be restricted to the target population.

Ethical Concerns with Electronic Interventions and Research

Although there is considerable controversy over the use of email or online therapy, electronic communication with participants (e.g., brief questions and responses, reminders) after initial in-person contact is considered legitimate and is gaining research and clinical attention. Because there is no way to completely ensure data security (since most email servers are not considered secure), precautions must be taken when sending and receiving email from participants. First of all, research participants must be made aware of the lack of security in email communication at the outset and have opportunities to cease participation if they are uncomfortable. Also, suggestions should be made to participants regarding how and when to

dispose of messages, particularly if they are sharing computers with a large student population.

It should be recognized, though, that these concerns exist not only with research via email and web pages, but also with all electronic personal communication aside from encrypted information such as social security and credit card numbers. Suler (1996) recognized, "of all the methods for developing relationships on the Internet, email is probably the most powerful" (p. 20) and therefore should not be abandoned simply because of its current limitations.

Subject recruitment and informed consent are also critical concerns when conducting web research (Smith & Leigh, 1997). Often, web researchers struggle to get diverse, representative samples because nearly anyone can access and complete questionnaires. To improve the quality of data collected, Schmidt (1997) suggests collecting some demographic information with questionnaires to ensure subject matching. The demographic information can be used to create a database for statistical analysis, and removing identifying information (e.g., name, email address) during data entry will preserve the confidentiality of the data. Additionally, some may argue that giving consent in an experiment by clicking a button is not as acceptable (or

even illegal) when compared to an individual's signature. All of these concerns are legitimate but can be addressed by selecting participants and gaining actual consent prior to the administration of web-based and/or email assessments.

When electronic methods are used to facilitate an in-person intervention, having knowledge of the sample and having already acquired adequate consent from participants alleviates many of the common methodological concerns with this type of research (Hewson, Laurent, & Vogel, 1996). In sum, while completely "virtual" research has a variety of ethical pitfalls, it appears that standard research protocols that incorporate some virtual components will be able to maintain their integrity with the correct precautions. Critical efforts must still be made to maximize the security of email communications and to ensure the quality and accuracy of data gathered.

Potential Benefits of Using Electronic Media

The combination of results from the alternative media research literature provides several hopeful outcomes for incorporating electronic methods into intervention research (Marks, Shaw, & Parkin, 1998). First, easier access to information and services (as provided by email and web

pages) may lead to earlier access to care. Those athletes with convenient access to the Internet and email may be more likely to actually look for and find information more quickly and then seek out sport psychology consultations at an earlier date. For instance, brief email contact following a team presentation may build rapport and trust and, as such, provide an opportunity for those athletes who would be initially reluctant to schedule a face-to-face meeting (Sampson, Kolodinsky, & Greeno, 1997; Suler, 1996). Many times, this reluctance may in part be due to overt coach interference (or fear of coach's reaction) and email contact can help bypass this barrier.

Second, more frequent exposure to sport psychology concepts has the potential to further educate and reduce the stigma often associated with sport psychology and mental training. With the development of research-based, attractive web sites covering applied sport psychology, the myths and realities of mental training will become clearer to a larger, more diverse audience.

Finally, it is recognized that when studies integrate electronic media into their design, they are immediately limiting their samples to those who have convenient access. With the rapid development and proliferation of Internet

technology, though, it appears that there will only be greater and greater numbers of athletes who seek help on the Internet. According to an Internet search study conducted by Sampson et al. (1997), sites related to mental health and online counseling are growing 72% annually. With the number of sport psychology websites also increasing each year, it will become important to establish a sound literature base to guide the development of these electronic interventions.

Currently, it is unclear which type of athletes will respond best to traditional or electronic services. Preliminary research suggests that providing Internet services as an adjunct to traditional interventions may involve a subset of athletes who previously would not have considered pursuing a psychology consultation (Marks et al., 1998; Sampson et al., 1997). Eventually, research may begin to explore the effect of personality factors or learning style on preferred type of intervention to further refine the process. At this stage, there is a growing need to study this virtual phenomenon so that the field of applied sport psychology is prepared to meet the needs of a new generation of athletes. Research in sport psychology, then, can begin to identify the demographic profile of

athletes who are most receptive to electronic services and how these services can be most effectively integrated into interventions. Overall, the Internet has the potential to educate all athletes who surf the net and may bring in athletes who would not have previously considered a counseling or sport psychology consultation.

Samuel Zizzi, at University of West Virginia, developed the following dissertation: the "Effectiveness of Traditional and Web-Based Interventions on Utilization of Sport Psychology Services: Exploring the Stages of Change" (Zizzi & Perna, 2002). The study examined the interaction of traditional and electronic contact methods with the stages of change model in a brief counseling intervention. The sample consisted of a total of 220 high school (n = 106) and college athletes (n = 114), including 115 in the Electronic Group and 105 in the Traditional Group. Overall, 14 teams participated in a sport psychology workshop including seven women's teams (n = 124) and seven men's teams (n = 96). Teams were randomly assigned to contact the sport psychology consultant either by traditional methods (in-person or phone) or by electronic methods (email or WebPages) after the workshop. Overall results suggest that electronic contact methods are at

least equal to, and in several cases superior to, traditional contact methods regarding generating interest and requests for service from athletes. The main practical implications for sport psychology consultants are addressed and the future directions for Transtheoretical and alternative media research in applied sport psychology are explored.

Prentiss Price, at the University of Kansas, developed AllAboutDepression.com web site and information survey designed to help researchers and practitioners better understand what it is that people want to know about depression. The majority of the web site provides excellent educational information on depression. There is a survey section that a web surfer can enter to take the survey. The survey queries what information individuals are looking for and how the web site could be better arranged to serve this purpose. Unlike Zizzi, who set his site up on West Virginia University's server, thereby limiting access to just his enrolled subject population as such functioning as an intranet, Prentiss Price set up her site on the World wide web, the Internet, for any web surfer to randomly participate. AllAboutDepression.com was funded entirely by Ms. Price and, unlike the West Virginia

study, is still up and running, collecting data, and reporting cumulative data back on site while continuing to educate the public all about depression.

Physical Activity Trends

In 1990, new health promotion and disease prevention goals and objectives were released (USPHS, 1990). Within the Physical Activity and Exercise area 15 specific objectives were advanced. Three objectives related to adherence/participation rates were: (a) increase to at least 60% the proportion of people 6 years of age and older, who participate in moderate physical activities 3 or more days per week for 20 min per occasion; (b) increase to at least 30% the proportion of people 6 years of age and older who participate in vigorous physical activities that promote the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 min or more per session; and (c) increase to at least 50% the proportion of people 6 years of age and older who regularly perform physical activities that maintain muscular strength, muscular endurance, and flexibility.

In 1996, the USDHHS, the CDC, and the President's Council on Physical Fitness and Sports produced a joint document titled *Physical Activity and Health: A Report of*

the Surgeon General. Four surveys provided data on physical activity for this review: (a) The National Health Interview Survey, which included questions on physical activity among adults in 1985, 1990, and in 1991; (b) the Behavioral Risk Factor Surveillance System, a state-based survey of adults that was conducted by state health departments, in collaboration with the CDC, and included questions on physical activity from 1986 through 1992 and in 1994; (c) the Third National Health and Nutrition Examination Survey of adults in the United States from 1988 through 1994 (data from Phase I, 1988 to 1991, were available for presentation in this report); and (d) the 1992 household-based National Health and Nutrition Examination Survey Youth Risk Behavior Survey, which was conducted in 1991, 1993, 1995 among students in grades 9 to 12 (USDHHS, 1996).

The report defined "regular, sustained physical activity during leisure time as any type or intensity of activity that occurs 5 times or more per week and 30 minutes or more per occasion (definition derived from NHIS and the Behavioral Risk Factor Surveillance System) (p. 180). "Regular, vigorous physical activity during leisure time" was defined as rhythmic contraction of large muscle

groups, performed at 50% or more of estimated age and sex specific maximum cardio-respiratory capacity, 3 times per week or more for at least 20 minutes per occasion (p. 181). "Physical inactivity" was defined as performing no vigorous activity (exercise or sports participation that made the respondent "sweat or breathe hard" for at least 20 minutes) and performing no light to moderate activity (walking or cycling for at least 30 minutes) (p. 188).

The main findings of the USDHHS 1996 Adult Survey report were:

1. Approximately 15% of U.S. adults engage regularly (3 times a week for at least 20 min) in vigorous physical activity during leisure time.

2. Approximately 22% of adults engage regularly (3 times a week for at least 30 min) in sustained physical activity of any intensity during leisure time.

3. About 25% of adults report no physical activity in their leisure time.

4. Physical inactivity is more prevalent among women than men, among blacks and Hispanics than whites, among older than younger adults, and among the less affluent than the more affluent.

5. The most popular leisure-time physical activities among adults are walking and gardening or yard work.

The main findings of the Adolescents and Young Adults Survey Results (USDHHS, 1996):

1. Only about one-half of U.S young people (ages 12 to 21 years) regularly participate in vigorous physical activity. One-fourth report no vigorous physical activity.

2. Approximately one-fourth of young people walk or bicycle (i.e., engage in light to moderate activity) nearly every day.

3. About 14% of young people report no recent vigorous or light to moderate physical activity. This indicator of inactivity is higher among females than males and among black females than white females.

4. Males are more likely than females to participate in vigorous physical activity, strengthening activities, and walking or bicycling.

5. Participation in all types of physical activity declines as age or grade in school increases.

6. Among high school students, enrollment in physical education remained unchanged during the first half of the

1990s. However, daily attendance in physical education declined from approximately 42% to 25%.

7. The percentage of high school students who were enrolled in physical education and who reported being physically active for at least 20 min in physical education classes declined from approximately 81% to 70% during the first half of this decade.

8. Only 19% of all high school students report being physically active for 20 min or more in daily physical education classes.

The Public Health Service report recommends further research needs (USDHHS, 1996):

1. Develop methods to monitor patterns of regular, moderate physical activity.

2. Improve the validity and comparability of self-reported physical activity in national surves.

3. Improve methods for identifying and tracking physical activity patterns among people with disabilities.

4. Routinely monitor the prevalence of physical activity among children under 12 years of age.

5. Routinely monitor school policy requirements and of student's participation in physical education classes in elementary, middle, and high schools.

Physical Activity Recommendations

Casperson et al. (1985) proposed that physical fitness is "a set of attributes that people have or achieve that relates to the ability to perform physical activity." (p. 126). In general, physical fitness is seen as the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies. A distinction has been made between performance-related fitness (muscular power, speed, agility, balance, reaction time) and health-related fitness (body composition, cardiovascular endurance, muscular endurance, muscular strength, flexibility) (Casperson et al.). Vigorous leisure-time physical activity prerequisites have now seen the inclusion of light and moderate activities. The task of describing and studying physical activity practices is now the more difficult for it. Vigorous leisure-time physical activity consists of easily remembered and described activities conducted during a readily segmented part of the day. Conversely, light-to-moderate physical activity consists of a multitude of mundane activities scattered throughout the day; not easily remembered or categorized (Leon, Connell, Jacobs, & Rauramaa, 1987).

Another factor that makes comparison of data from different studies challenging is the ever-changing physical activity guidelines. Since 1990, 22 statements regarding standards or criteria for exercise, by 10 different national organizations, have been reported. A synopsis follows.

The review by Pollock (1973) of the type of exercise needed to improve aerobic power and body composition subsequently formed the basis for the 1978 ACSM position statement entitled *The Recommended Quantity and Quality of Exercise for Developing and Maintaining Fitness in Healthy Adults.* The recommendation was for a frequency of exercise of 3 to 5 days per week at 60 to 90% of maximal heart rate for an duration of 15 to 60 min by use of large muscle groups in such activities as running, jogging, walking, hiking, swimming, skating, cycling, rowing, x-country skiing, amongst others.

In 1990, ACSM updated its 1978 position by adding the development of muscular strength and endurance as a major objective, with one set of 8 to 12 repetitions of 8 to 10 different exercises at least two times per week. The cardiovascular component recommended an increase to 20 to 60 min per session. Additionally, ACSM recognized that

activities of moderate intensity may reduce the risk for certain chronic degenerative diseases (health purposes) while not being of sufficient quantity or quality to improve maximal oxygen uptake (performance purposes). The ACSM recognizes the potential health benefits of regular exercise performed more frequently and for longer duration but at lower intensities than prescribed in this position paper. In 1992, the American Heart Association published a statement identifying physical inactivity as a fourth major risk factor for Coronary Heart Disease, along with smoking, high blood pressure, and high blood cholesterol.

Results of training studies conducted on middle-aged and older persons between 1970 and 1990 demonstrated that significant cardiorespiratory performance and health-related benefits could be obtained at more moderate levels of activity intensity than previously thought. As a result, the more recent CDC and ACSM guidelines (Pate et al., 1995) recommend that all adults perform 30 min or more of moderate-intensity physical activity on most, and preferably all, days - either in a single session or accumulated in multiple bouts, each lasting at least 8 to 10 min. This guideline thus significantly differs from the earlier ones on three points: (a) it reduces the minimum

starting exercise intensity from 60% to 50% in healthy adults and to 40% in patients or persons with very low fitness, (b) it increases the frequency of exercise sessions from 3 days per week to 5 to 7 days per week, depending on intensity and session duration, and (c) it includes the option of accumulating the minimum of 30 min per day in multiple sessions lasting at least 8 to 10 min

Although this latest recommendation may make it easier for non-exercisers to adopt and adhere to an exercise or physical activity program, it creates further chaos when trying to compare adherence and participation rates for purposes of measuring outcomes or reporting. It also makes it difficult to commence, let alone compare any longitudinal studies as the basis for comparison, the definition of regular exercise, seemingly changes yearly.

Summary

If the general public is to reach the obtainable health benefits that regular exercise can provide it must do so by addressing the psychosocial issues of our time. In industrialized nations, modern technology has limited much daily physical activity once required for occupational labor and transportation. To combat this lack of physical activity the public has witnessed an increase or

proliferation of gyms, and fitness centers, once a habitat for athletes only, now a destination for the fountain of youth seeking masses. The artificial exercise environment comes with its own set of problems (access, safety, supervision, education, programming, equipment, location, transportation issues, etc.), but it is the perceptions, motives, and beliefs of the potential exerciser (health susceptibility, enjoyment, weight management, challenge, etc.) that will ultimately determine the priority of its use and the excuse of its nonuse (lack of participation).

Much research work has focused on the physical determinants of exercise: mode, frequency, intensity, and duration/time. The late 1980s and 1990s saw increased research into the psychosocial realm of health behavior change. By further examining the psychosocial issues, particularly self-efficacy, barrier or excuse making, motives, and relapse prevention, perhaps more effective interventions may be applied so exercise becomes as second nature as other healthy habits like brushing one's teeth or hand washing.

CHAPTER 3

METHODOLOGY

The purpose of this study was to differentiate the relapse stage of exercise behavior change in terms of excuses, or perceived barriers, self-efficacy, decisional balance and motives; via an Internet based data collection system. This chapter is organized under the following headings: (a) Research Design, (b) Participants, (c) Measures, (d) Procedures, and (e) Data Analyses.

Research Design

For the purpose of this study, cross-sectional descriptive data were collected via an electronic survey form hosted on an Internet web site. Individuals in differing stages of health behavior (exercise) readiness to change were analyzed. The present study compared Relapsers with people at other stages of change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives.

Participants and Recruitment Procedures

This study was based on data from those members of the adult population with access to the Internet and involved the use of convenience sampling. A press release announcing this study was sent to fitness/health related

journals, magazines, listserves, and web sites. Although the decision to print the press release is made by the publication or web host, and there is no guarantee that a press release would be printed or posted, prior research indicates that web-based projects are able to adequately recruit research participants (Mehta, 1995; Stanton, 1998).

It is unknown how many of the press releases were posted on various websites or printed in publication, as no mechanism for capturing the personal identification data of respondents, such as e-mail address, was used. The last question on the survey did ask respondents how they heard about the survey. Over 48% of respondents heard about the EXCUSERCISE survey by word of mouth (friend, co-worker, or family member). Over 47% of respondents heard about this survey by e-mail. The remaining 5% indicated they heard about the survey through press release, random web surf, web search engine, print or other media source. It is known that the EXCUSERCISE web survey e-mail announcement was posted on the American Psychological Association, and the Association for the Advancement of Applied Sport Psychology listserves. Other listserves and health related web sites were targeted. The e-mail and EXCUSERCISE web link was posted or distributed to several Kinesiology and

Psychology departments in the United States (Boston University, SUNY-Binghamton, and Temple University) as well as the United Kingdom. The following corporations distributed the survey to their workers or clients: CIGNA HealthCare, Education Testing Services, and Evolution Sports Science. This sample of convenience included respondents who were either direct contacts of the researcher or contacts of contacts.

The study enrolled 931 men and women, over 18 years in age, from any ethnic background and stage of readiness to exercise. The use of minors as participants was discouraged by placement of written warnings. Participants were asked to read the consent form prior to commencing the questionnaire.

There was no attempt to specifically solicit or exclude participation by any participants other than minors. No control, nor screen, for any specific health problems was initiated. Participants were not deceived in any manner to gain their permission for participation.

The common denominator among participants was their use of a computer, the Internet, and an interest in exercise, health behavior change, or excuses. The Internet is public domain. The questionnaire residing on the

EXCUSERCISE.org web site can be accessed 24 hr each day, 7 days per week. Individuals may access the site whenever they desire as a point of destination, random surfing, or via search engine so virtually no disruption of present lifestyle occurred.

No monetary compensation was offered. Educational information on exercise and behavior modification/change was made available for volitional on site viewing. Participants gained a greater understanding into the psychosocial elements of behavior modification as they relate to exercise. Sample practical applications and strategies designed to counter the excuses to avoid physical activity and exercise was displayed on the web site. Due to time constraints individual feedback upon completion of the survey was not provided for respondents. Instead, a group data report was posted on the web site upon dissertation completion and acceptance.

There was no physical danger in the participation of answering the questionnaire or long-range risks to the participants who participated in this study. Educational information for review on the EXCUSERCISE.org web site is scientifically sound and in line with the standard of care. Respondents and web site surfers were encouraged to seek

physician clearance prior to exercise program commencement as well as medical consultation should injury occur. Specific exercises and individualized exercise "prescriptions" were not dispensed to participants through this research project. Only generalized information on the benefits of exercise and strategies to maintain exercise were provided on the accompanying educational web site.

Measures

In addition to demographic information, the following established measures were used to collect information on exercise Relapser characteristics: Exercise Decisional Balance, Stages of Exercise Behavior Change, Lapse and Relapse, and Self-Efficacy for Exercise Behavior Scale. Reasons for participation or motives and excuses or perceived barriers for lack of participation were also assessed via a shortened representative checklist derived from a validated but rather lengthy questionnaire.

1. Demographic Information. Basic demographic data were collected to determine the sample and group comparison analysis (see Survey Form in Appendix A).

2. Stages of Exercise Behavior Change. The Stages of Exercise Behavior Change is a widely used and validated measure of an individual's progress in terms of readiness

for exercise participation (Marcus, Rakowski et al. 1992). The Stages of Exercise Behavior Change contains five items used in an algorithm to classify participants into one of five stages of change for exercise behavior: Precontemplation, Contemplation, Preparation, Action, and Maintenance. Participants respond to items such as "I currently do not exercise," or "I intend to exercise in the next 6 months." Participants are assigned to the stage based on evaluation of the pattern of items they endorse using a true-false format.

Items for the Stages of Exercise Behavior Change were developed from a measure for smoking cessation but modified to describe exercise behavior. A Preparation stage (item) was added after an evaluation of 1,063 participants' responses revealed that many responses clustered in the Action and Maintenance stages of change. Test-retest reliability over a 2-week period, using the kappa index of reliability, was 0.78. Validity for the Stages of Exercise Behavior Change was demonstrated by correlating activity levels with stages of change of 1,063 employees at a Rhode Island division of a government agency, wherein 70% were males (*M* age = 41.1 years, *SD* ± 10.8). Four hundred twenty employees of a Rhode Island medical center, 85% of whom

were women (*M* age = 40.5 years; *SD* ± 11.0) were also analyzed. Additionally, a third sample (*n* = 20) of employees of a Rhode Island Medical Center were used to establish test-retest reliability estimates.

3. Lapse and Relapse. The CFLRI (1995) developed an algorithm to extend the Transtheoretical Model of Change to include a Relapse stage of change. The CFLRI found 16% of the studied 2,500 Canadians to be classified in the Relapse Stage of change. Relapse was defined as, "I was active at times during the last 12 months, I am no longer active, but I intend to resume physical activity in the future." For the present study a similar distinction was used to classify stage participants into relapse while additional questions attempted to quantifiably describe information about the duration and frequency of relapses. Participants were asked how long (how many weeks) it had been since they last participated in regular (3 days in 1 week) exercise. How many times during the past 12 months had they stopped and restarted participating in regular exercise?

4. Exercise Decisional Balance. The Exercise Decisional Balance is a widely used and well-validated measure of an individual's perceptions regarding the benefits and detriments of exercising (Marcus, Rakowski, et

al., 1992). The measure contains 10 Pro items (e.g., "I would feel more confident if I exercise regularly") and 6 Con items (e.g., "Regular exercise would take too much of my time"). Participants responded to how important each item is with respect to their decision to exercise or to not exercise using a 5-point Likert-type scale with the anchorings 1 ("not at all important") to 5 ("extremely important").

Both Exercise Decisional Balance subscales possess adequate internal consistency: Cronbach alpha's .95 (Pro) and .79 (Con). Construct validity for the Exercise Decisional Balance was originally determined by factor analysis indicating a two-factor solution accounting for approximately 60% of explained variance (Marcus, Rakowski et al., 1992). Subsequent construct and predictive validity have been demonstrated by findings that persons exercising at least three times per week have significantly higher Pro-scores and lower Con-scores as compared to nonexercisers who are not contemplating exercise (noncontemplators). Although recent meta-analysis (Marshall & Biddle, 2001) suggests that the Exercise Decisional Balance may not differentiate persons with a long-term history of exercise from those with short-term

exercise history, the Exercise Decisional Balance does differentiate exercisers from nonexercisers.

5. Self-Efficacy for Exercise Behavior Scale. The Self-Efficacy for Exercise Behavior Scale is a widely used and well-validated measure of participants' confidence in their ability to persist with regular exercise under various impediments (Marcus, Selby et al., 1992). Participants are asked if they are confident they can persist in regular exercise when they are tired, in a bad mood, on vacation, and so forth. Participants respond to each of five items using a 5-point ordinal scale with the anchorings 1 (not at all confident) to 5 (very confident).

Construct validity for the Self-Efficacy for Exercise Behavior Scale was originally determined as items were selected to represent the categories negative affect, resisting relapse, and making time for exercise. This study made use of the following Self-Efficacy indices: Negative Affect, Excuses, Alone, Inconvenience, Resistance from Others and Weather. These categories (or factors) were derived from previous factor analytic research on exercise and smoking behavior involving the descriptive statistics for 1,673 employees (70% were male; *M* age = 41.1 years, *SD* ± 10.8) at a Rhode Island division of a

government agency and for 429 employees of a Rhode Island hospital, (85% were women; *M* age = 40.5 years, *SD* ± 11.0). A third sample (*n* = 20) of employees of a Rhode Island hospital were used to establish a reliability estimate. A Pearson product-moment test-retest reliability coefficient of 0.90 (n = 20) was reported across a 2-week period.

6. Exercise Barriers. The Exercise Barrier checklist has not been formally validated but is associated with the list generated by the 1995 CFLRI Stages of Change in Exercise study. Items represent common items on the widely used and validated survey tool. The use of such a checklist encouraged greater participant rates and greater survey completion by reducing the overall length of the proposed study survey questionnaire. Past and present activity behavior as well as future intentions of 2,500 Canadians were examined in this study.

The list of perceived barriers/excuses for not remaining active includes: Lack of Time, Lack of Energy, Lack of Motivation, Excessive Cost, Illness/Injury, Lack of Facilities Nearby, Feeling Uncomfortable, Lack of Skill, Fear of Injury, Lack of Safe Places, Lack of Childcare, Lack of Partner, Insufficient Programs, Lack of Support, and Lack of Transportation. The purpose of this measure was to evaluate participants' perceived barriers or excuses for

lapsing from their exercise program. Participants were asked to think why they personally choose not to exercise or might not choose to exercise, not whether they think the statements are good excuses for anybody not to exercise. Participants were asked to rate the frequency of occurrence of each item using a 5-point Likert-type scale with the anchorings 1 (not at all) to 5 (repeatedly).

7. Exercise Motives. The checklist used for this study is associated with the list generated from the Exercise Motivations Inventory developed by Markland & Hardy (1993) and Markland & Ingledew (1997). The items represent common items on the widely used and validated survey tool. The use of such a checklist encouraged greater participant rates and greater survey completion by reducing the overall length of the study survey questionnaire.

The Exercise Motivations Inventory is a 44 item validated inventory containing 12 subscales (Markland & Hardy, 1993). The subscales include the following motives or reasons to exercise: Stress Management, Revitalization, Enjoyment, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Appearance, Strength & Endurance, and Nimbleness. For each item, participants respond to the stem "Personally, I exercise…." using a 6-point ordinal scale with the anchorings 0 (not at all true

for me) to 5 (very true for me). Construction of the Exercise Motivations Inventory was generated from an examination of the literature on exercise adherence and from participants' (n = 76) responses to an open-ended questionnaire in which they were asked to state the three main reasons why they exercised. It was adapted from the Personal Incentives for Exercise Questionnaire (Duda & Tappe, 1989). Factor analysis with equamax rotation, yielded 12 factors accounting for 69.40% of the variance. Cronbach alpha reliability coefficients (n = 249) ranged from .63 to .92 for the 12 subscales. Test-retest reliability coefficients (n = 57) ranged from .59 to .88 across a 4 to 5 week interval.

Website and Access Procedures

Participants gained access to the survey via a web site constructed for the purpose of education and research. The survey was housed on the EXCUSERCISE.org web site. EXCUSERCISE.org is a free access web site, located on the Internet, and provided education on behavior change, specifically exercise. The optional participation in the proposed questionnaire resided on this web site. Key words like "exercise," "fitness," "adherence," "excuses," "lapse," "relapse," "change," and "behavior modification"

were provided to the web site server host to enable search engines to locate and list this site more readily when subject or topic is desired by a web surfer/user.

Web Site Research Component

Participation in this project was entirely on a voluntary basis. Individuals wishing to participate indicated their acceptance of the informed consent (see Appendix B) by selecting the "I Accept" button located at the conclusion of the informed consent form. Those individuals who did not wish to participate in the survey were still able to leave the questionnaire section and return to the main page of the EXCUSERCISE.org web site. Selecting the "I Accept" button linked the participant to the server where the research survey form resided. For some computer's web browsers, this link may have taken several seconds to load, but opened directly to the survey.

The EXCUSERCISE survey consisted of 68 questions and took approximately 10 to 15 min to complete. Prior to the commencement of each section there were directions instructing the participant how to answer the section's questions. Participants needed only point and click their mouse to complete each question. Only completed questionnaires were tallied. Participants were asked to

fill out the questionnaire only once. Once completed, the study results and interpretation were posted on the EXCUSERCISE.org site home page.

To ensure data confidentiality the actual questionnaire form and data were hosted on another linked site: Originally, the question was designed and hosted on the following site: http://or.psychology.dal.ca/~wcs/hidden/home.html. This site makes use of S-Ware's WWW Survey Assistant software. The web site specializes in the collection and reporting of data. It is free for academic and non-commercial use. The web server utilizes the latest technology to maintain data security. Their patented software scans the potential participant's e-mail address in search of duplicate entries in order to avoid multiple data entries from one web address. However, due to operating difficulties and a lack of technical support (hence the reason why it is free), a switch to a fee based site, KeySurvey.com, and the use of their survey form tool was necessary. Review of the survey tool process is covered in the Discussion section.

There was no incentive or reward offered to encourage participants to take the survey more than once from

different web addresses. Continents and states were utilized to identify geographic regions for comparison analysis.

Web Site Educational Component

Individuals were able to browse the web site for information on healthy behavior change and exercise adherence strategies to counter their favorite excuses. Individuals were encouraged to return to the EXCUSERCISE.org web site as many times as they wish in order to use its contents as a resource.

Web Site Planning

Many of the web site domain registration, hosting, design, and data collection options were determined based on striking a balance among cost, ease of operation, and visibility.

Pick an Internet Service Provider

Internet Service Providers bring the Internet to you for a fee of course. It may be in the form of high-speed cable, or the telephone lines. Those that are offered for free usually carry a never ending stream of advertisement banners and pop-up windows. It may be free at work, but you may have limited access during office hours due to corporate policy. If one uses university access, the price

is often a computer fee charged each semester. Most Internet Service Provider carriers charge a monthly fee, up to $50 or more. The $50 per month price tag is often for a high-speed cable line in the home, even more costly for businesses.

Domain Registration

If one desires a special reserved name, like EXCUSERCISE, for easy remembrance and access it may cost on the average of $20 per year to keep. If someone already has the ideal Internet domain name, it may cost several thousands of dollars in negotiating a buyout.

Web Hosting Options

Every web site needs a home, a place to go. This can be done for free, but the site will look like a war zone as advertisements will pop up all over the place and banners will hang at every corner. This is not a viable option for researchers who do not want survey takers to be distracted, redirected, or misled. Often free hosting at housed communities will require one to use the host's name as part of your URL (Internet) address, once again making it difficult for search engines to find and quite lengthy to remember. Prices range from free to $199 or more per month depending upon services desired (e.g., number of e-mail

address and number of web pages). As discussed earlier, colleges or universities are low cost options (The $30 per semester fee is included for enrolled students at Temple University in 2002), but the drawback is that the site resides in a rather obscure address, making it difficult for search engines to locate. Another consideration focuses on the consolidation of web hosting companies in the Internet technology sector. One should pick a reputable hosting company with a lengthy operating history and an impressive client list, or face the prospect that one's chosen web hosting company may go bankrupt or cease to operate, making it virtually impossible to collect data.

Web Site Design

If one has lots of time to learn the web design language, hypertext markup language (HTML), one can design your web site for free - better yet, exchange services with a friend or acquaintance. Often college students may be employed for much less money than a seasoned professional. Perhaps they could do it for a class project. Another option is to use a web editor. Software products like Microsoft Front Page, Claris Home Page, or Dreamweaver, can be purchased for $70 to $250. These products allow individuals to use shells and fill them with content,

graphics, colors, and links. Some web hosting sites, like Network Solutions, also offer their own web site editing tool and charge a fee of $6.95 or more per month. Additional options such as pages and access for page editing will increase the cost.

Data Collection Options

For those with a background using Microsoft Excel, setting up a spreadsheet for descriptive data collection and manipulation may be a quick and simple process. Utilizing database software like Microsoft Access may allow for appealing looking survey forms and corresponding data tables. The low cost attraction may lose its luster when considering how many times one may have to transfer data back and forth between having surveys e-mailed to an account and then downloading to your personal computer or main frame. Much data have been lost in cyber-space during this transfer process.

Active Server Pages and Application Server

Providers can provide interface among data collection, storage, and data analysis, often incurring an associated charge. The proliferation of these types of services over the past few years is dwindling in the new market adjustments. Similar to web hosting choices, research

carefully the prospective vendors or one may lose data faster than a mouse click should the company file bankruptcy. Data collection/management companies are plentiful for business applications but few for research purposes. A company called Datstat.com, started by a Ph.D. after she struggled through her e-dissertation process, offers all the bells and whistles for e-research. The drawback is the several thousands of dollars that it would cost just to start the consultative process. Another option for data collection, storage, and manipulation are e-polling services like Alxnet, Misterpoll, Infopoll, Zoomerang, and KeySurvey. By providing a secured link from one's site to theirs, a well-designed form will pop up. Participants fill out the form and upon conclusion a link back will provide group data results in a nice presentation format right on your web site.

Prices for these services are determined by how long one intends to keep the survey online, how many questions are included in the survey, how many respondents and hence storage space one will need, as well as what type of data manipulation one wishes to perform. Prices range from free for 1 month limited storage, up to $350 or more. As this

is a new and hot commodity, the prices are rising monthly. S-Ware's WWW Survey Assistant tool is a similar product that is free for academic and non-commercial use, but comes with no technical support. To utilize their software for more than 1 week, special permission from the administrator needs to be obtained to keep the survey tool active.

Web Site Content

Figure 1 depicts the web site content matrix flow. This map of the web site gives a general overview and layout of the EXCUSERCISE web pages. An outlined description of the web site content matrix follows.

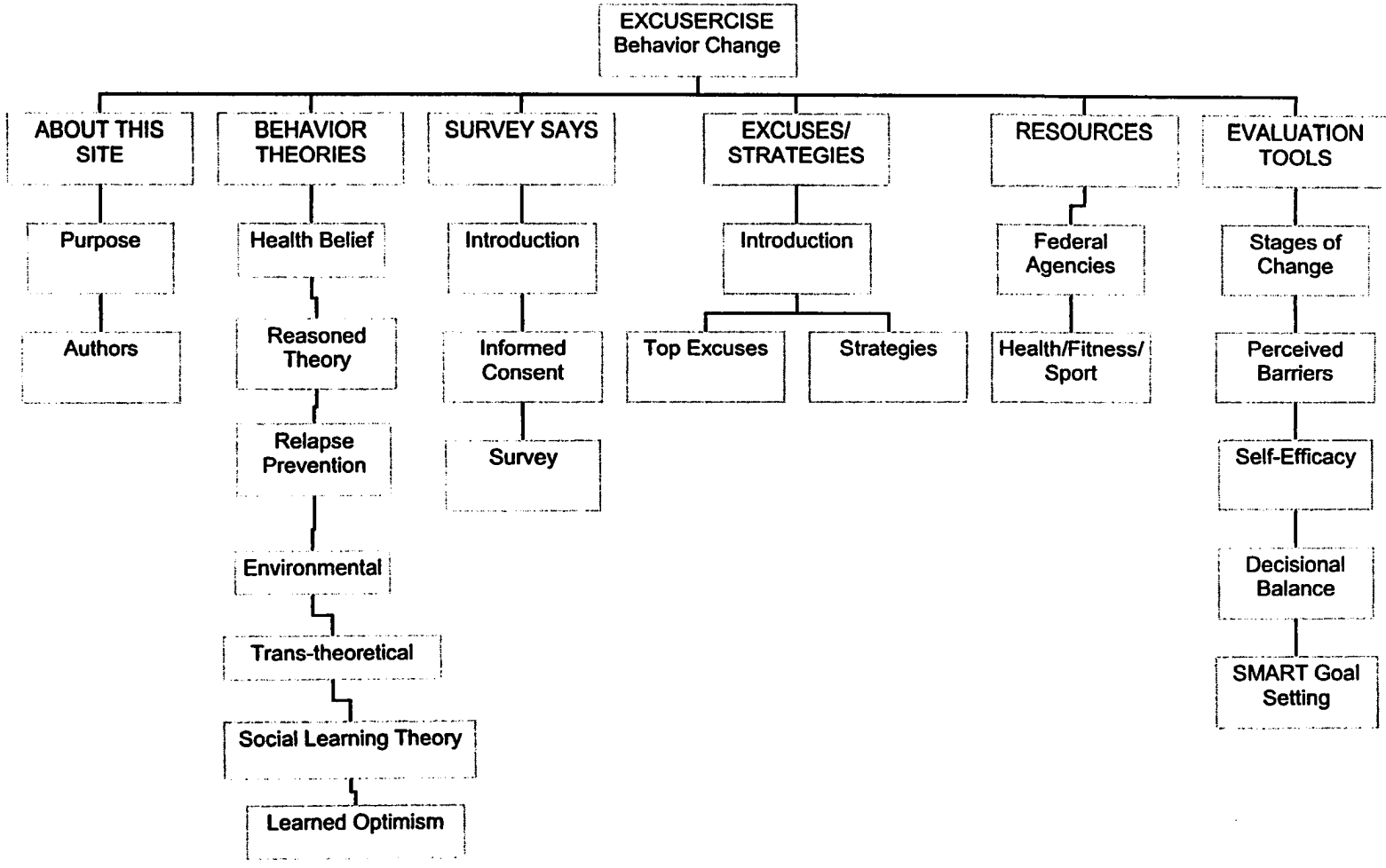

Figure 1. Web site content matrix flow.

About This Site

This section of the EXCUSERCISE web site contains information on the purpose and intent of the web site, and background of the author. E-mail contact has been provided.

Behavior Theories

This section of the EXCUSERCISE web site contains verbal and schematic flow charts of the current state-of-the-art of health behavior change theories: Health Belief, Reasoned Theory, Relapse Prevention, Environmental, Transtheoretical, Social Learning Theory, and Learned Optimism (see Chapter 2 for behavior theory review of literature).

Survey Says

This section of the EXCUSERCISE web site contains the introduction, informed consent, and link to survey storage site where data was collected. A link back to the home page of the EXCUSERCISE web site was provided at the end of the survey.

Excuses/Strategies

This section of the EXCUSERCISE web site contains the introduction to the rationale behind excuses. The top 15 excuses according to the CFLRI (1995) survey were listed.

A link to associated strategies ensued. Visitors were able to depart from the site with practical applications for their excuses or reasons for lack of participation in physical activity or exercise.

Resources/Links

This section of the EXCUSERCISE web site contains the top resource sites for topics like behavior change, fitness, health promotion, wellness, physical activity, organizations, government, companies, and universities were listed.

Evaluation Tools

This section of the EXCUSERCISE web site contains the part of the web site was designed for participants as well as for practitioners. Copies of some survey tools like the Stages of Change, Perceived Barriers, Self-Efficacy, Decisional balance, and SMART Goal setting are featured.

Marketing the Web Site for Optimal Participation Rate

In order to obtain adequate participant rates it becomes imperative to "market" the web site correctly. Several methods were utilized to ensure this process.

Domain Names

The use of Internet domain names like "EXCUSERCISE" make it easier for individuals to find your web site,

particularly by word of mouth. The use of University and community board sites, though lower in cost, make it more difficult for web browser search engines to locate one's web site as the URL address may be extremely long and/or unrelated to the site's subject matter.

Meta-Tags for Search Engines

Web browser search engines require one to place words in their window box that reflect the topic of interest. Web site designers place "meta-tags," or headers, into the HTML language code that allow search engines to find the desired topic. Those web sites with more inclusive and properly related meta-tags have their sites pop up higher on the completed searches.

May is National Fitness Month

The original intent of this study was to launch this web site in conjunction with the May National Fitness Month in 2003. With interest often heightened by spring fever, launching the web site in May for fitness related education may result in enrolling a larger number of respondents. This mid-year follow-up may be timely for individuals who commenced their physical activity, or exercise program in January and may now be lapsing back into sedentary lifestyle. A dose of relapse prevention may be in order.

Ask Corporations to Circulate via Intranet

Some corporations verbally agreed to distribute the EXCUSERCISE web site press release internally on their corporate intranet. A simple click of the highlighted EXCUSERCUSE.org URL address will bring them to the web site. A more specific Internet address brought respondenat directly to the web site page where the survey resided. Some companies employ a "firewall" boundary that blocked their employees from making contact with the worldwide web/Internet during the workday. This is where the catchy name such as EXCUSERCISE can be easily remembered for those who want to contact the site outside their company time at a later date.

Solicit List Serves

A vast array of Internet list serves representing a diverse mixture of organizations were contacted in order to avoid the "preaching to the choir" phenomena. Posting of survey link to EXCUSERCISE.org was often at the discretion of the webmaster, but larger sites and organizations often require their administrative boards to vote on such issues. A monthly or quarterly organizational vote may be too late for data collection.

Other Web Sites

Contact and press releases were sent to health, fitness, wellness, medical, alternative medicine, psychological, sociological, polling services and search engine web sites in attempts to solicit free marketing of the EXCUSERCISE web site and survey questionnaire.

Print

Press releases in newspapers, magazines: (such as Runner's World), Weight Watchers, fitness centers, local and national newspapers, organizations. These organizations may also have a web site presence.

Data Analyses

Prior to testing specific hypotheses, descriptive statistics were calculated to describe participants' demographic and exercise relapse characteristics. Next, the frequency distributions of primary outcome and predictor variables were examined for normality (i.e., skewness and kurtosis). Preliminary analyses compared stage of change groups with respect to demographic equivalence (e.g., age and gender). As described further in this section, data was transformed and analyses to determine covariates as dictated by preliminary analyses

and the specific data analytic technique being used to test study hypotheses were conducted (Howell, 1992).

Next a descriptive analysis on length of lapse was conducted. The *mean* (± *SD*) number of weeks was used to determine the average length of lapse. Had the data been markedly skewed, the median and inter-quartile range would have been used to describe the common length of a lapse. The descriptive analysis on frequency of lapse (number of start/stops during past year) was conducted in the same manner.

The primary hypothesis (and sub-hypotheses) states that people who relapse from exercise back into sedentary lifestyle have different exercise determinants, and have different motives for exercise as compared to people at other stages of exercise behavior change (i.e., Precontemplation, Contemplation, Preparation, Action, and Maintenance). Because multiple correlated outcome variables (e.g., self-efficacy, barriers, and motives for exercise) were tested in this hypothesis, the multiple analysis of variance (MANOVA) procedure was utilized as the primary data analytic technique (Kerlinger, 1986; Thomas &

Nelson, 1996). Because many of these outcomes are comprised of multiple subscales, data analysis was conducted in phases.

First, a global score was calculated for barriers and Self-Efficacy. Then a 6 (stages) by 4 (Pro-Exercise Decisional Balance, Con-Exercise Decisional Balance, Self-Efficacy, barriers) MANOVA was calculated. Where appropriate, variables with distributions with significant departures from normality was transformed according to standard data transformation procedures (e.g., a log or arc-sign transformations) before running the MANOVA. Dunnett post-hoc tests were used to follow-up significant univariate effects.

The MANOVA procedure is superior to calculating separate ANOVA because the MANOVA minimizes the potential family-wise error that is inherent in running multiple ANOVA. Although the Dunnett post-hoc test is primarily used when the intent is to compare various treatments against a control condition (rather than make all possible pair-wise comparisons), its use in this case is appropriate (Howell, 1992). Specifically, the intent here is to compare Relapsers (the reference group) to other stage of change groups. The benefit of this procedure is that it

maximizes the ability to detect significant differences between Relapsers and persons classified into other stages of change while minimizing the chance of spurious findings from testing all possible pair-wise comparisons that are not relevant to the primary purposes and hypotheses of the study.

Because the exercise motives questionnaire has 14 subscales that are not easily grouped into broader factors, an additional 6 (stages of change) by 14 (motives) MANOVA was calculated. The same post-hoc procedures and considerations in using covariates and data transformations as described above was used in this analysis. Lastly, all analyses incorporated a .05 (alpha) level of significance, and missing data was treated on a list-wise basis (i.e., only participants with a complete data set were included in analyses). Mean substitution was intended for those cases where a specific item was left blank on a survey. In no cases were a participant's data used if he or she omitted more than two items from any one measure.

CHAPTER 4

RESULTS, DISCUSSIONS, AND CONCLUSIONS

The purpose of this study was to define the exercise relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population. For continuity purposes the results, discussions, and conclusions for the Hypothesis 1 are presented in their entirety prior to the presentation of Hypotheses 2, 3, and 4. The results of this study and the discussions of these results and conclusions are presented in the following sections: (a) Descriptive Statistics, (b) Hypothesis 1, (c) Hypothesis 2, (d) Hypothesis 3, (e) Hypothesis 4, (e) Additional Analyses, (f) General Discussion, (g) Implications for Researchers, and (h) Implications for Practitioners.

Descriptive Statistics

Descriptive statistics were calculated to characterize sample demographics and check for assumptions of normality, which were met for all non-categorical demographic variables (e.g., age) and outcome variables (i.e., Decisional Balance, Self-Efficacy, Motives and Barrier

scores). Nine hundred and thirty-one participants responded to the survey from six global regions. The majority (96%) of the respondents were from North America. Respondents lived in 39 of the 50 United States. The largest percent of respondents resided in three states of the Northeast region of the United States (e.g., Massachusetts [25%], Pennsylvania [17.6%], and New Jersey [11.4%]). Respondents ranged between 18 and 115 years in age with a mean age of 37.4 (*SD* = 12.87) years. The 115 year old respondent was left in for statistical calculations as a check of all survey data seemed consistent with responses one might expect of an individual that age. Deletion of this outlier would not change statistical significance over the 931 respondents.

The respondents were primarily comprised of Caucasians (88.2%). Males were 37.6% of the respondents with women comprising 62.4% of the respondents. Approximately half (53%) of respondents were married, and approximately 60% (59.7%) of respondents had no children. Respondents tended to be highly educated, with about a third being college graduates (36.9%) and an additional 47.5% of the respondents held a post-graduate degree. Table 1 depicts sample demographics by stage of exercise.

Table 1. Respondent Characteristics by Stage of Change Classification in Percent Frequency

Variable	Total (931)	Pre (28)	Cont (75)	Prep (105)	Act (150)	Main (481)	Rel (92)
Gender							
Male	37.6	42.9	38.7	27.6	39.3	39.3	34.8
Female	62.4	57.1	61.3	72.4	60.7	60.7	65.2
Ethnicity							
Asian	2.6	3.6	5.3	2.9	2.7	2.5	0.0
Black/Afr	3.5	0.0	5.3	6.7	6.0	1.9	4.3
Hispanic	2.9	0.0	2.7	2.9	3.3	2.7	4.3
Mid East	0.4	0.0	1.3	0.0	0.2	0.4	0.7
Native Am	1.9	7.1	6.7	0.0	2.0	1.2	2.2
Pacific Is	0.4	0.0	0.0	0.0	0.7	0.4	1.1
White/Cau	88.2	89.3	78.7	86.7	84.7	91.1	88.0
Marriage*							
Single/ Widow	38.5	17.9	26.6	32.4	46.7	40.5	38.0
Married/ Partner	53.0	60.7	65.4	59.1	44.7	51.6	54.4
Divorce Separate	8.6	21.4	8.0	8.7	8.6	7.9	7.6
Education							
Grade Schl	0.8	3.6	2.7	1.9	0.0	0.2	1.1
High Schl	8.6	14.3	14.7	5.7	10.0	6.9	12.0
Trade Schl	1.2	3.6	1.3	0.0	1.3	1.2	1.1
2-yr Colg	5.0	10.7	9.3	6.7	2.7	4.4	5.4
Colg-Under	36.9	14.3	32.0	37.1	49.3	36.6	29.3
Masters	30.7	35.7	28.0	24.8	26.7	33.1	32.6
Doctoral	16.8	17.9	12.0	23.8	10.0	17.7	18.5
Children							
No child	59.7	67.9	52.0	42.9	32.0	38.3	43.5
1+ child	40.3	32.1	48.0	57.1	68.0	61.6	56.5

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Act = Action, Main = Maintenance, Rel = Relapse.
Marriage was collapsed from six into three categories.
Schl = School, Colg = College.
The number of respondents is found in ( ).

Although more women (62.4%) than men (37.6) responded to the survey, there was not a significant difference in the relative percentage of women in any one stage, (Chi

Square [N = 931, DF = 5] = 5.92, p = .31). All outcome variables were checked for skewness and kurtosis, and all variables met assumptions of normality. No data transformations were required for subsequent analyses.

Hypothesis 1

Results

People who relapse from exercise back into sedentary lifestyle have different determinants from people at other stages of exercise behavior change. Ninety-two respondents were categorized into the relapse stage based on the definition of regular exercise participation. The length of average lapse from regular exercise averaged 4.03 months (SD ± 3.24 months). Exercise Relapsers restarted their exercise program an average of 2.17 times (SD ± 1.36 times) during the past 12 months (see Table 2).

The number of months lapsed and the number of times Relapsers had restarted their exercise program were both normally distributed. Additionally, the length of lapse was not significantly different between men (M = 3.97, SD ± 3.64 months) and women (M = 4.07, SD ± 3.04 months) Relapsers (t [90] = .137, p = .89).

The average number of times a respondents restarted an exercise program was assessed across stages of exercise

Table 2. Mean Number of Regular Exercise Restarts Across Stage of Exercise Change

Stage	N	Mean	Standard Deviation
Precontemplation	28	.25	.59
Contemplation	75	1.53	1.93
Preparation	105	2.84	2.64
Action	150	2.27	1.86
Maintenance	481	.78	1.50
Relapse	92	2.17	1.36

Note. $N = 931$

readiness to change. The number of times respondents restarted their exercise program was statistically significant (F (5,924) = 40.73, $p < .001$). Respondents in the Maintenance stage of change (M = .78, SD ± 1.50 restarts) had significantly fewer breaks in their regular exercise routine compared to all other stages. The exact opposite was true of respondents in the Preparation stage of change (M = 2.84, SD ± 2.64 restarts). Respondents in the Relapse stage of change were not significantly different from the Action stage of change (M = 2.27, SD ± 1.86) respondents or from Contemplators (M = 1.53, SD ± 1.93). Relapsers also restarted exercise significantly more times than Precontemplators (M = .25, SD ± .59).

The MANOVA procedure was used to test Hypotheses 1 that people who relapse from exercise back into sedentary lifestyle have different exercise determinants (e.g., Pro and Con for exercise, Self-Efficacy, and Exercise Barriers). Determinant scores were significantly different across stage of change classification, Wilks Lamda (20, 3058) = .61, equivalent $F = 25.02$, $p < .001$. Follow-up Univariate tests further indicated that there were significant differences among stages of change classification for each outcome as follows: Decisional Balance Pro (F [5, 925] = 22.11), Decisional Balance Con (F [5, 925] = 17.32), Barriers (F [5, 925] = 39.65), and Self-Efficacy (F [5, 925] = 86.37), all p values were < .001. As depicted in Tables 3 and 4, Relapsers had significantly more Pro decisional balance determinants than Precontemplators but significantly fewer Pro decisional balance determinants than Maintainers and most resembled individuals in Preparation and Action.

Relapsers had significantly fewer Con for exercise than Contemplators and Preparation stage of change respondents.

Relapsers had significantly fewer Barriers for exercisers than Contemplators but significantly more

Table 3. Hypothesis 1 Determinant Mean Scores Across Stage of Exercise Change Classification

Determinants	Stage	*Mean*	*SD*	*N*
Decisional Balance Pro	Pre	14.29	6.24	28
	Cont	19.03	4.18	75
	Prep	19.87	3.50	105
	Act	19.85	3.89	150
	Main	21.17	3.58	481
	Rel	19.64	3.78	92
	Total	20.28	4.00	931
Decisional Balance Con	Pre	8.32	4.31	28
	Cont	9.43	3.67	75
	Prep	8.07	2.74	105
	Act	7.19	2.15	150
	Main	6.82	2.17	481
	Rel	7.14	2.63	92
	Total	7.31	2.62	931
Barriers	Pre	33.79	8.49	28
	Cont	34.60	7.73	75
	Prep	31.70	5.49	105
	Act	29.66	7.04	150
	Main	26.30	5.75	481
	Rel	30.61	5.12	92
	Total	28.77	6.77	931
Self-Efficacy	Pre	35.68	16.72	28
	Cont	41.21	11.74	75
	Prep	44.36	10.78	105
	Act	53.09	12.08	150
	Main	62.31	13.22	481
	Rel	45.85	13.06	92
	Total	54.67	15.43	931

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance

Table 4. Hypothesis 1: Significant Dunnet Post Hoc Multiple Comparisons of Relapsers with Other Stages in Terms of Determinants

Determinants	Stage	Mean Difference from Relapsers
Decisional Balance (Pros)	Precontemplation	-5.36
	Maintenance	1.53
Decisional Balance (Cons)	Contemplation	2.29
	Prepcontemplation	0.93
Barriers	Contemplation	3.99
	Maintenance	-4.31
Self-Efficacy	Precontemplation	-10.17
	Action	7.25
	Maintenance	16.46

Note. A (-) sign indicates that stage had a significantly lower score than Relapsers, whereas no sign indicates participants at that stage had a significantly higher score compared to Relapsers. N = 931, significance level $p < .05$.

barriers than Maintainers. Relapsers had significantly higher Self-Efficacy for exercise than Precontemplators, and significantly less Self-Efficacy than both Action and Maintenance stage of change respondents.

Discussions

Relapse Duration and Frequency

The average length of time respondents spent in relapse was 4 months twice a year. These data reveal that, during the course of a year, Relapsers exercise for only 2

months before a 4 month relapse, followed by another 2 months prior to a second 4-month relapse.

According to the report from the Surgeon General (USDHHS, 1996), many of the beneficial effects of exercise training diminish within 2 weeks if physical activity is substantially reduced, and effects disappear entirely within 2 to 8 months if physical activity is not resumed. Certainly any health, fitness or wellness benefits derived by regular exercise would be minimized or eliminated by the time the average relapse is terminated. Interventions and strategies to reduce the length (and to a lesser degree the frequency) of relapse need to be developed. More frequent relapses, perhaps even planned "vacations from exercise," could be tolerated provided the found length of 4 months could be reduced.

Sallis and Hovell (1990) reported on the number of times over a lifetime that individuals in a San Diego, California community relapsed for 3 or more months after exercising vigorously for at least 6 months. Approximately 60% of the exercisers reported 0 lapses, 20% 1 to 2 relapses, and 20% reported 3 or more relapses. While not a direct comparison, the percent of relapses appear rather elevated. The data from the Sallis and Hovell study were

based on individuals who exercised vigorously for at least 6 months. These exercisers may be more habitual exercisers than most exercisers. However, it is difficult to believe that 60% of these exercisers did not have a single relapse over a lifetime.

Relapse Prevalence

Research suggests that adoption of exercise occurs in stages and in accordance with the Transtheoretical Model/Stages of Change and that movement through these stages is cyclical, involving a pattern of adoption, maintenance, relapse, and re-adoption over time. Data from the present EXCUSERCISE study indicated the following distribution in the stage of exercise change: 3% in Precontemplation, 7.9% in Contemplation, 11.4% in Preparation, 16.2% in Action, 51.4% in Maintenance, and 10% in Relapse.

The CFLRI (1995) attempted to correlate the stages of exercise change and three different stages of relapse with activity level (measured in kilocalories of energy expenditure). The researchers reported the following distributions of Canadians in physical activity stages: < 2% in Precontemplation, 4% in Contemplation/Relapse (collapsed all three stages), < 2% in Potential Relapse,

< 2% in Dropout. Many more inactive or somewhat active Canadians were found to be in the Contemplation/Preparation stages of change. In addition, Canadians who were more active (burned more calories) were in greater numbers in the Action and Maintenance stages of change.

In an earlier cross-cultural study, Marcus and Owen (1992) tested whether subjects from the United States and Australia differed in terms of exercise adoption. Eight percent of subjects in the United States and 7.2% of subjects in Australian were classified as being in the Precontemplation stage of change, 30.8% (United States) and 35.9% (Australian) as being in the Contemplation stage, 28.8% (United States) and 25.4% (Australian) as being in the Preparation stage, 13.2% (United States) and 6.8% (Australian) as being in the Action stage, and 19.3% (United States) and 24.7% (Australian) as being in the Maintenance stage of change. Although this study did not incorporate the Relapse stage, it is worthy of note as the same definition of exercise was utilized for the two populations, resulting in proportionally similar stage response rates across different global populations.

Marshall and Biddle (2001) completed a meta-analyses of 71 studies (N = 68,580) utilizing a five stages of

change classification approach. They reported the following aggregated stage distribution data: 14% in Precontemplation, 16% in Contemplation, 23% in Preparation, 11% in Action, and 36% in Maintenance.

When compared to the Relapse stage of change studies of the CFLRI (1995) and the current EXCUSERCISE study to the study of Marcus and Owen (1992), it is clear that Marcus and Owen have a higher incidence of participants in the Contemplation and Preparation stages of change. Their review of studies that did not include a Relapse stage of change, Velicer, Prochaska, Fava, Norman, and Redding (1998) reported that for smoking and exercise only about 15% of respondents regressed to the Precontemplation stage of change while most respondents regressed to Contemplation and Preparation stages of change. It is not unreasonable to believe that if a Relapse stage of change was included in the studies cited by Velicer et al., the incidence of relapse may have been similar to the 10% in the current study and 16% in the CFLRI study. This provides additional justification for separating Relapse into its own stage so that individuals who relapse are not classified as Contemplators but rather have determinants that are closer

to the respondents in the Action stage of change. This has ramifications for intervention strategies as well.

Data from the United States (USDHHS, 1996) and Australian (Marcus & Owen, 1992) indicate that approximately 30% of the population is active (Action and Maintenance stages). These active populations are considerably lower (by 30% or more) than those reported in the Canadian (CFLRI, 1995) and EXCUSERCISE studies. The inclusion of a Relapse stage in the Canadian study accounted for only 16% of that difference, while Relapse accounted for 10% of the EXCUSERCISE study. Perhaps it is true that consistent definitions still represent the largest problem in terms of physical activity and exercise research. It may indeed be more likely that subject self-selection into the EXCUSERCISE study is a primary problem involved in the distribution of higher numbers of action and maintenance respondents.

Respondent Demographics

The mean age of the average EXCUSERCISE respondent was 37.4 years as was the mean age of the average Relapse stage respondent. Schmidt (1997) found that the average web survey users/responders were primarily males in their late teens or early thirties, with an above average socio-

economic status and education level. While the EXCUSERCISE study attracted a highly educated sample (36.6% college undergraduate, 30.9% post graduate master's level, and 17% post graduate doctoral level), the overwhelming percentage were women (62.6%) compared with only 37.4% male respondents.

A mass distribution to professional organizations such as the Association for the Advancement of Applied Sport Psychology and the American Psychological Association, probably accounted for the demographic nature of the sample (i.e., highly educated and relatively fit with a wide age range from students to professors). Distribution to former (CIGNA Health Care) and recent (Evolution Sports Science) clients, as well as family and friends, may have also contributed to the relatively higher age and education level of respondents.

Conclusions

People who relapse from exercise back into a sedentary lifestyle do have different determinants from people at other stages of exercise behavior change. Generally, Relapsers differ significantly from other stages of change in terms of Decisional Balance, Self-Efficacy, Motives, and Barriers. Specifically, a relapse lasts for four months

and occurs twice per year. Ten percent of EXCUSERCISE respondents were found to be in this stage of change.

Hypothesis 2

Results

Hypothesis 2 stated that people who relapse from exercise back into sedentary lifestyle have differing motives for exercise participation compared to people at other stages of change. A MANOVA was calculated for exercise motivations. Stage of change classification interacted significantly with exercise motivation scores, Wilks Lamda (70, 4346) = .566 (equivalent $F = 5.88$), $p < .001$). Univariate tests indicated that there were significant differences among stages of change classifications for all 14 different motives. Relapsers were significantly different from respondents in other stage classifications on all 14 motives (see Table 5). In general, Relapsers were different from Maintainers and Precontemplators, but were generally similar to respondents characterized in Action and Preparation stages of change.

The highest scoring motives (more intrinsic and affect oriented) for Relapsers were: positive health, appearance, strength and endurance, weight management, revitalization, stress management. The lowest scoring motives were more

Table 5. Hypothesis 2: Mean Motive Scores Across Stages of Exercise Change

Motives	Stage	*Mean*	*SD*	*N*
Stress Management	Pre	2.71	1.44	28
	Cont	3.27	1.18	75
	Prep	3.54	1.08	105
	Act	3.76	1.08	150
	Main	4.10	1.07	481
	Relap	3.78	1.20	92
	Total	3.84	1.15	931
Revitalization	Pre	2.43	1.37	28
	Cont	3.41	1.15	75
	Prep	3.67	.93	105
	Act	3.99	.97	150
	Main	4.33	.89	481
	Rel	3.85	1.09	92
	Total	4.02	1.05	931
Enjoyment	Pre	1.96	1.04	28
	Cont	2.63	1.31	75
	Prep	2.83	1.24	105
	Act	3.51	1.17	150
	Main	4.15	.99	481
	Rel	3.37	1.14	92
	Total	3.63	1.26	931
Challenge	Pre	1.68	.94	28
	Cont	2.64	1.36	75
	Prep	2.67	1.12	105
	Act	3.39	1.25	150
	Main	3.94	1.14	481
	Rel	3.25	1.22	92
	Total	3.47	1.31	931
Social Recognition	Pre	1.32	.77	28
	Cont	1.88	.96	75
	Prep	1.70	.90	105
	Act	2.16	1.24	150
	Main	2.50	1.25	481
	Relap	1.98	1.11	92
	Total	2.22	1.21	931

Table 5. Continued

Motives	Stage	Mean	SD	N
Affiliation	Pre	1.54	.84	28
	Cont	1.96	1.01	75
	Prep	1.86	1.10	105
	Act	2.20	1.24	150
	Main	2.76	1.30	481
	Rel	1.98	.98	92
	Total	2.39	1.27	931
Competition	Pre	1.50	.92	28
	Cont	1.99	1.21	75
	Prep	2.05	1.15	105
	Act	2.41	1.38	150
	Main	2.90	1.45	481
	Rel	2.03	1.12	92
	Total	2.52	1.41	931
Health Pressures	Pre	2.46	1.45	28
	Cont	3.11	1.31	75
	Prep	2.74	1.41	105
	Act	2.33	1.45	150
	Main	2.20	1.36	481
	Rel	2.37	1.32	92
	Total	2.38	1.40	931
Ill-Health Avoidance	Pre	2.32	1.22	28
	Cont	3.61	1.14	75
	Prep	3.59	1.28	105
	Act	3.63	1.16	150
	Main	3.79	1.25	481
	Relap	3.47	1.29	92
	Total	3.65	1.26	931
Positive Health	Pre	2.75	1.04	28
	Cont	3.88	.93	75
	Prep	4.09	.92	105
	Act	4.40	.76	150
	Main	4.62	.69	481
	Rel	4.28	.91	92
	Total	4.37	.87	931

Table 5. Continued

Motives	Stage	Mean	SD	N
Weight Management	Pre	2.79	1.42	28
	Cont	3.95	1.20	75
	Prep	4.09	1.14	105
	Act	4.17	1.18	150
	Main	4.08	1.21	481
	Rel	3.99	1.22	92
	Total	4.04	1.22	931
Appearance	Pre	3.11	1.40	28
	Cont	3.93	1.09	75
	Prep	4.22	.83	105
	Act	4.35	.89	150
	Main	4.25	.96	481
	Rel	4.25	.90	92
	Total	4.20	.98	931
Strength & Endurance	Pre	2.64	1.37	28
	Cont	3.69	1.11	75
	Prep	3.70	.98	105
	Act	4.33	.92	150
	Main	4.46	.80	481
	Relap	4.11	.88	92
	Total	4.20	.98	931
Nimbleness	Pre	2.39	1.17	28
	Cont	3.51	1.23	75
	Prep	3.56	1.07	105
	Act	3.75	1.16	150
	Main	3.90	1.13	481
	Rel	3.52	1.19	92
	Total	3.73	1.18	931

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance. Likert scale: 1 = Not at all true for me, 3 = Sometimes true for me, 5 = Very true for me.

extrinsic and health oriented. For Relapsers these were:

challenge, health pressures, competition, social

recognition, and affiliation. Relapsers have motives that are most similar to those individuals in the Action and Preparation stage of change. Relapsers differ significantly from Maintainers on multiple and intrinsic motives. More specifically, Dunnet Post Hoc tests were calculated to compare Relapsers with other stages of change in terms of motives for regular exercise. Relapsers exercised significantly more frequently than Precontemplators for the following motives: stress management, revitalization, enjoyment, challenge, social recognition, affiliation, ill-health avoidance, positive health, weight management, appearance, nimbleness, and strength and endurance (see Table 6).

Relapsers exercised significantly more frequently than Contemplators for the following motives: stress management, revitalization, enjoyment, challenge, health pressures, positive-health, strength, and endurance. Relapsers exercised significantly more frequently than those in the Preparation stage for the following motives: enjoyment, challenge, strength and endurance. Relapsers did not differ significantly from those respondents in the Action stage in terms of exercise motives.

Table 6. Hypothesis 2: Significant Dunnet Post Hoc Multiple Comparisons of Relapsers With Other Stages in Terms of Motives

Motives	Stage	Mean Difference From Relapsers
Stress Management	Pre	-1.07
	Cont	-0.52
	Main	0.32
Revitalization	Pre	-1.42
	Con	-0.43
	Main	0.49
Enjoyment	Pre	-1.41
	Cont	-0.74
	Prep	-0.54
	Main	0.78
Challenge	Pre	-1.57
	Cont	-0.61
	Prep	-0.58
	Main	0.69
Social Recognition	Pre	-0.66
	Main	0.52
Affiliation	Main	0.78
Competition	Main	0.86
Health Pressures	Cont	0.74
Ill-Health Avoidance	Pre	-1.15
Positive Health	Pre	-1.53
	Cont	-0.40
	Main	0.34
Weight Management	Pre	-1.20
Appearance	Pre	-1.14

Table 6. Continued

Motives	Stage	Mean Difference From Relapsers
Strength & Endurance	Pre	-1.47
	Cont	-0.42
	Prep	-0.41
	Main	0.35
Nimbleness	Pre	-1.13

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance A (-) sign indicates that stage had a significantly lower score than Relapsers, whereas no sign indicates participants at that stage had a significantly higher score compared to Relapsers. Likert scale: 1 = Not at all true for me, 3 = Sometimes true for me, 5 = Very true for me. N = 931, significance level $p < .05$.

stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, positive-health, nimbleness, strength and endurance.

Discussion

Relapsers

The current EXCUSERCISE study specifically looked at defining the Relapse stage of change. In general, Relapsers were different from Maintainers and Precontemplators, but were generally similar to respondents in Action and Preparation in terms of motivations to exercise. This would imply that people who relapse probably do not require information on the benefits

(cognitive approaches) of resuming exercise but rather more action oriented (behavioral approaches). According to Marcus, Rossi, et al. (1992), the five experiential or cognitive processes believed to be used more frequently during early stages of change are: consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation. The five behavioral processes believed to be more frequently used during later (advanced) stages of change are counterconditioning, helping relationships, reinforcement management, self-liberation, and stimulus control.

Relapsers have the same motives as respondents in the Preparation and Action stage of exercise change. Notably, Relapsers differed from those in Maintenance in terms of intrinsic motivations such as stress management, revitalization, enjoyment, challenge, positive health. This is important because intrinsic motives are associated with long term exercise adherence.

In Ingledew et al. (1998) studied exercise motives and stages of change. They found that extrinsic (specifically bodily) motives dominate during the early stages of exercise adoption, while intrinsic (specifically enjoyment)

motives are important for progression to continuation and maintenance of exercise. Ingledew et al. did not employ the Relapse stage of change.

The results of Ingledew et al. (1998) are consistent with the self-determination theory of Deci and Ryan (1985) where a distinction is made between intrinsic and extrinsic motivation. Where extrinsically motivated, individuals participate in order to obtain rewards that are extrinsic to the behavior itself. When intrinsically motivated, individuals participate primarily for the enjoyment and satisfaction they derive from their participation. Exercising for reasons of enjoyment and challenge reflect intrinsic motivation, while exercising to control weight, improve appearance, or for social recognition indicates extrinsic motivation (Duda & Tappe, 1989; Markland & Ingledew, 1997).

Intrinsic motivations have been shown to play a major role in long-term exercise adherence (Wankel, 1985). However, initial exercise adoption is motivated by reasons of health and fitness benefits (Dishman, 1988).

When asked why (what reason) they play a school sport, the number one reply of children was to have fun, the ultimate intrinsic motivation (American Footwear

Association, 1991). The least reported reason for playing a school sport was to win, the ultimate extrinsic motivation. Fine and Sachs (1997) surveyed children and reported that the top three reasons for youth sport participation were: to make friends, have fun, and develop skills/challenge oneself. It appears fun is an exercise motive that allows children to play sports for hours at a time. Perhaps adults should rediscover the inner child in themselves for their exercise choices. Finding activities that are fun and that can be used to improve or maintain fitness may be a bigger stimulus to find time during the day to exercise than finding time just to exercise.

Relapse vs. Maintenance

An additional note of concern is how Relapsers differ from Maintainers. There were not significant differences in motives between Relapsers and respondents in the Action stage, but there were eight motives bearing significant difference between Relapsers and those in the Maintenance stage of change. A similar pattern to the data reported by Ingledew et al. (1998) was noted in that the respondents in the Maintenance stage had more intrinsic motivation (i.e., higher reported results for enjoyment, challenge and revitalization; lower reported results for weight

management, ill-health avoidance, appearance). Extrinsic factors such as social recognition, affiliation, and competition were also observed.

Conclusion

People who relapse from exercise back into sedentary lifestyle do have differing motives for exercise participation compared to people at other stages of change. Generally, Relapsers were similar to respondents in Preparation and Action in terms of motivations to exercise. Most specifically, a significant difference among Relapsers and those in Maintenance was noted. Maintainers reported many more motives in quantity as well as quality, especially intrinsic motives such as enjoyment.

Hypothesis 3

Results

Hypothesis 3 stated that people who relapse from exercise back into sedentary lifestyle have differing levels of Self-Efficacy compared to people at other stages of change. A MANOVA was performed for Self-Efficacy. The classifications of stage of change classification interacted significantly with exercise Self-Efficacy scores, Wilks Lamda (20, 3058) = .605 (equivalent F = 25.02), $p < .001$. (see Table 7).

Table 7. Hypothesis 3: Mean Self-Efficacy Composite Scores Across Stages of Exercise Change

Self-Efficacy Index	Stage	*Mean*	*SD*	*N*
Negative Affect	Pre	6.04	3.69	28
	Cont	7.36	3.17	75
	Prep	7.57	2.95	105
	Act	9.66	2.90	150
	Main	11.97	2.80	481
	Relap	8.08	3.01	92
	Total	10.17	3.54	931
Excuses	Pre	3.60	2.29	28
	Cont	4.48	2.42	75
	Prep	4.11	2.08	105
	Act	5.47	2.20	150
	Main	7.03	2.21	481
	Rel	4.24	2.19	92
	Total	5.86	2.55	931
Alone	Pre	5.21	3.30	28
	Cont	6.07	2.53	75
	Prep	6.95	2.60	105
	Act	8.15	2.17	150
	Main	8.84	2.09	481
	Rel	7.11	2.61	92
	Total	8.01	2.52	931
Inconvenience	Pre	6.32	3.80	28
	Cont	7.04	2.91	75
	Prep	8.15	2.96	105
	Act	9.13	3.28	150
	Main	10.90	3.41	481
	Rel	8.60	3.60	92
	Total	9.62	3.63	931
Resistance from Others	Pre	8.04	4.41	28
	Cont	9.61	3.54	75
	Prep	10.31	3.72	105
	Act	11.60	3.22	150
	Main	12.56	3.04	481
	Relap	9.79	4.21	92
	Total	11.50	3.60	931

Table 7. Continued

Self-Efficacy Index	Stage	*Mean*	*SD*	*N*
Weather	Pre	4.54	2.89	28
	Cont	4.55	2.23	75
	Prep	5.00	2.24	105
	Act	6.40	2.27	150
	Main	7.70	2.18	481
	Rel	5.50	2.63	92
	Total	6.62	2.58	931

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance. Likert scale: 1 = Not at all confident, 3 = Somewhat confident, 5 = Completely confident. N = 931, significance level $p < .05$.

The three highest scoring Self-Efficacy subscales (respondents most confident they can exercise under these conditions) reported by Relapsers were: resistance from others, inconvenience, and negative affect. The three lowest scoring subscales (respondents least confident they can exercise under these conditions) reported by Relapsers were: exercising alone, bad weather conditions, and excuses. Relapsers are most similar to those respondents in the Preparation stage in terms of Self-Efficacy subscale score. Relapsers are significantly different from Maintainers on all 6 subscales and Action significantly different on 5 of the 6 subscales.

As reported earlier, Relapsers had significantly higher Self-Efficacy for exercise than Precontemplators,

and significantly less Self-Efficacy than both Action and Maintenance stage respondents. Dunnet Post Hoc tests (see Table 8) further indicated that there were significant differences among stage of change classification and certain indices of Self-Efficacy. Relapsers had significantly higher exercise Self-Efficacy than Precontemplators on the following Self-Efficacy sub-scale indices: negative affect, exercising alone, and inconvenience. Relapsers also had significantly higher exercise Self-Efficacy than Contemplators in the Self-Efficacy sub-scale indices of: exercising alone, inconvenience, and exercising in inclement weather. Relapsers did not differ statistically from respondents in the Preparation stage of change in terms of exercise Self-Efficacy.

Relapsers had significantly lower Self-Efficacy scores than those individuals in the Action stage of readiness to change specifically in terms of the following Self-Efficacy sub-scale indices: negative affect, excuses, exercising alone, resistance from others, and exercising in inclement weather. When compared to Maintainers, Relapsers had significantly lower Self-Efficacy along the following

Table 8. Hypothesis 3: Significant Dunnet Post Hoc Multiple Comparisons of Relapsers With Other Stages in Terms of Self-Efficacy Indices

Self-Efficacy Indices	Stage	Mean Difference From Relapsers
Negative Affect	Pre	-2.04
	Act	1.58
	Main	3.89
Excuses	Act	1.21
	Main	2.79
Alone	Pre	-1.89
	Cont	-1.04
	Act	1.05
	Main	1.73
Inconvenience	Pre	-2.28
	Cont	-1.56
	Main	2.30
Resistance from Others	Act	1.81
	Main	2.77
Weather	Cont	-0.95
	Act	0.90
	Main	2.21

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance
A (-) sign indicates that stage had a significantly lower score than Relapsers, whereas no sign indicates participants at that stage had a significantly higher score compared to Relapsers. Likert scale: 1 = Not at all confident, 3 = Somewhat confident, 5 = Completely confident. N = 931, significance level $p < .05$.

Self-Efficacy sub-scale indices: negative affect, excuses, exercising alone, inconvenience, resistance from others, and exercising in inclement weather.

Discussion

Self-Efficacy

EXCUSERCISE study results indicated a similar pattern in reference to self-efficacy as did Marcus, Selby et al. (1992) in that there was an increase in Self-Efficacy in higher or advancing stages of change. Studies have shown a consistent positive relation between exercise self-efficacy and stage of change (Marcus, Selby et al., 1992; Marcus, Eaton, Rossi, & Harlow, 1994; Nigg & Courneya, 1998). In fact, higher efficacy is associated with higher or advancing stage of change (Marcus & Simkin, 1994; Prochaska & Marcus, 1994; Reed, 1999). Marcus and coworkers have shown that self-efficacy can successfully differentiate among individuals at most stages of change.

People in the Relapse stage had similar overall Self-Efficacy scores to those individuals in the Preparation stage of change. Specifically, Relapsers had significantly lower scores for self-efficacy scores than those respondents classified as Maintenance in terms of negative affect, excuses, and resistance from others, but higher than individuals in Contemplation and Precontemplation stages of change. These data suggest that Relapsers, rather than recycling to a beginning Transtheoretical

Model/Stages of Change (Precontemplation or Contemplation stages), are most similar to people initiating exercise behavior change (Preparation & Action). When compared to respondents in Action and Maintenance stages of change, Relapsers had significantly lower Self-Efficacy scores for the following subscale indices: negative affect, excuses, exercising alone, resistance from others, and exercising in inclement weather.

The review of Marshall and Biddle (2001) on exercise self-efficacy indicated confidence to be active increases with each stage of change, as proposed by the Transtheoretical Model/Stages of Change. However, in opposition to Transtheoretical Model/Stages of Change theoretical predictions, the pattern of increase in self-efficacy appeared nonlinear, with a moderate effect in Precontemplation to Contemplation change, small to moderate effect in Contemplation to Preparation change, moderate effect in Preparation to Action change, and moderate to large effect in Action to Maintenance.

The Self-Efficacy construct represents the situation specific confidence that people have that they can cope with high-risk situations without relapsing to their unhealthy or high-risk habit. This concept is represented

by either a temptation measure or a Self-Efficacy scale. Velicer et al. (1998) found that temptation was high in Precontemplation and Contemplation stages of change while at the same time Self-Efficacy was low. Somewhere in the Preparation to Action stage of change the two intersect and reverse their polarity. In the Action stage of change the temptation is low and the Self-Efficacy high. Both diverge even further in the Maintenance phase. This temptation vs. efficacy battle seems to occur for Relapsers in the EXCUSERCISE study at just that stage of readiness, between Preparation and Action.

Contemplation to Preparation is the transition that displays the smallest increase in self-efficacy. This is based on the meta-analysis of Marshall and Biddle (2001) of exercise studies utilizing the Transtheoretical/Stages of Change Model. In the present EXCUSERCISE study self-efficacy was the single most significant determinant between Relapsers and those in the Maintenance stage of change of exercise. This has important implications in terms of how best to intervene to increase exercise adherence. Designing fitness programs to improve self-efficacy would improve the likelihood of a longer time in the Maintenance stage of change.

Decisional Balance

This EXCUSERCISE study follows a similar relationship pattern found by Marcus, Rakowski et al. (1992) and Velicer et al. (1998) in regard to voluntary healthy behavior adoption. The Pros, exemplified by such statements as, "I would feel less stress if I exercised regularly," tend to be low in the Precontemplation stage of change, rise significantly in the Contemplation stage of change, rise once again in the Preparation and hold throughout the Action stages of change, before rising again in the Maintenance stage of change. Relapsers tend to have scores similar to those individuals in Preparation and Action. The Cons, exemplified by such statements as, "I would feel embarrassed if people saw me exercising," tend to be somewhat high in the Precontemplation stage of change, rise even higher in the Contemplation before decreasing in Preparation, Action, and Maintenance. Relapsers are closest to those individuals in the Action stage in terms of their readiness to exercise.

The concept of evaluating potential gains (Pros) and losses (Cons) associated with adopting a new behavior has its origins in the conflict model of decision-making of Janis and Mann (1977). Summaries of narrative reviews in

the physical activity area (Buxton, Wyse, & Mercer, 1996; Reed, 1999) indicate that Pros of change generally increase across the stages of change. Marshall and Biddle (2001) reported that for behavioral Pros all effect estimates were significant and positive (except for Contemplation to Preparation change), suggesting that perceived benefits of exercise increase for every forward transition in stage of change. No studies on relapse, or regression of stages of exercise change were reported. For exercise behavior Cons, all effect estimates were small to moderate, significant and negative, suggesting that the perceived disadvantages of becoming physically active decrease across all stages of change. These findings are in accordance with model predictions.

The Decisional balance construct reflects the individual's relative weighing of Pros and Cons of changing. The original four categories of Pros and Cons proposed by Janis and Mann (1977) were tested and reduced to two categories by Prochaska et al. (1994). Smoking and exercise have similar patterns across the first three stages of behavior change, but according to Velicer et al. (1998) the acquisition of a healthy behavior, like exercise, continues to show a high level of Pros during the

Action and Maintenance stages of change. This probably reflects the fact that maintaining a program of regular exercise requires a continual series of decisions while smoking eventually becomes irrelevant, extinct, or terminated.

Conclusion

People who relapse from exercise back into sedentary lifestyle do have differing levels of self-efficacy compared to people at other stages of change. Generally, Self-Efficacy scores and decisional balance pros increased with advancing stage of change. Specifically, Relapsers Self-Efficacy scores were closest to those individuals in the Preparation stage of change, while furthest from those in the Maintenance stage of change, particularly in reference to negative affect, excuses, and resistance from others.

Hypothesis 4

Results

Hypothesis 4 stated that people who relapse from exercise back into sedentary lifestyle have differing excuses or barriers compared to people at other stages of change. The data in Table 9 presents the barrier frequencies for individuals in the Relapse stage of

Table 9. Hypothesis 4: Mean Barrier Frequency Ratings for Relapsers

Barrier	*Mean*	*SD*
Lack of Time	3.14	1.03
Lack of Motivation	2.86	1.11
Lack of Energy	2.84	0.95
Acute Illness/Injury	2.53	1.07
Feeling Sad or Blue	2.05	1.03
Lack of Facilities	1.62	0.93
Lack of Support	1.52	0.85
Excessive Cost	1.46	0.84
Lack of Partner	1.44	0.83
Feeling Uncomfortable	1.42	0.80
Lack of Safe Places	1.42	0.75
Lack of Skill	1.33	0.67
Insufficient Programs	1.33	0.65
Fear of Injury	1.32	0.67
Lack of Childcare	1.30	0.80
Lack of Transportation	1.18	0.54

Note. Likert scale: 1 = Never, 3 = Sometimes, 5 = Always

exercise behavior change. The top five barriers reported by Relapsers were: lack of time, lack of motivation, lack of energy, acute illness/injury, and feeling sad or blue. Excluding illness/injury barrier the remaining four barriers are affect-oriented and may be classified as a Mood/Affect component. For Relapsers the lowest reported

frequencies of barriers were: injury, childcare, and transportation. Relapsers are most similar (no barrier differences) to those individuals in Preparation and Action stages of change in terms of barriers. Relapsers are most dissimilar to individuals in Maintenance and Contemplation.

Relapsers had significantly fewer Barriers for exercisers than Contemplators, but significantly more barriers than Maintainers (see Tables 10 and 11). Barrier scores were significantly different across stages; Wilks Lamda (80, 4385) = .51, equivalent $F = 8.21$, $p < .001$.

More specifically, Dunnet Post Hoc Multiple Regression Analyses were calculated to compare Relapsers with other stages of change in terms of barriers to regular exercise. Precontemplators reported the following barriers significantly less frequently than Relapsers: lack of energy and acute illness/injury. Precontemplators reported the following barriers significantly more frequently than Relapsers: lack of motivation, excessive cost, lack of skill, lack of partner, and insufficient programs.

Contemplators reported the following barrier significantly less frequently than Relapsers: acute illness/injury. Contemplators reported the following barriers significantly more frequently than Relapsers: lack

Table 10. Hypothesis 4: Mean Barrier Frequency Ratings Across Stages of Exercise Change

Barriers	Stage	*Mean*	*SD*	*N*
Lack of Time	Pre	3.32	1.68	28
	Cont	3.72	1.13	75
	Prep	3.69	.84	105
	Act	3.26	.80	150
	Main	2.80	.95	481
	Relap	3.59	.93	92
	Total	3.14	1.03	931
Lack of Energy	Pre	2.68	1.16	28
	Cont	3.72	.86	75
	Prep	3.38	.84	105
	Act	2.84	.87	150
	Main	2.51	.84	481
	Rel	3.25	.87	92
	Total	2.84	.95	931
Lack of Motivation	Pre	3.96	1.29	28
	Cont	4.07	.78	75
	Prep	3.51	.89	105
	Act	2.89	.91	150
	Main	2.36	.95	481
	Rel	3.34	.95	92
	Total	2.86	1.11	931
Excessive Cost	Pre	2.32	1.36	28
	Cont	1.95	1.17	75
	Prep	1.50	.82	105
	Act	1.51	.88	150
	Main	1.29	.66	481
	Rel	1.52	.79	92
	Total	1.46	.84	931
Acute Illness/Injury	Pre	1.75	1.11	28
	Cont	1.97	.99	75
	Prep	2.27	1.11	105
	Act	2.55	1.10	150
	Main	2.72	1.00	481
	Relap	2.52	1.11	92
	Total	2.53	1.07	931

Table 10. continued

Barriers	Stage	*Mean*	*SD*	*N*
Fear of Injury	Pre	1.36	.87	28
	Cont	1.44	.86	75
	Prep	1.37	.71	105
	Act	1.32	.67	150
	Main	1.32	.65	481
	Rel	1.17	.46	92
	Total	1.32	.67	931
Lack of Facilities	Pre	2.07	1.41	28
	Cont	1.85	1.00	75
	Prep	1.66	.86	105
	Act	1.80	1.03	150
	Main	1.49	.83	481
	Rel	1.67	.97	92
	Total	1.62	.93	931
Lack of Skill	Pre	2.04	1.20	28
	Cont	1.75	.82	75
	Prep	1.34	.60	105
	Act	1.39	.72	150
	Main	1.22	.54	481
	Rel	1.29	.62	92
	Total	1.33	.67	931
Feeling Uncomfortable	Pre	1.89	1.17	28
	Cont	1.92	1.06	75
	Prep	1.70	1.05	105
	Act	1.52	.88	150
	Main	1.21	.51	481
	Relap	1.49	.83	92
	Total	1.42	.80	931
Lack of Safe Places	Pre	1.46	.92	28
	Cont	1.55	.79	75
	Prep	1.48	.74	105
	Act	1.46	.84	150
	Main	1.38	.71	481
	Rel	1.37	.72	92
	Total	1.42	.75	931

Table 10. continued

Barriers	Stage	*Mean*	*SD*	*N*
Lack of Childcare	Pre	1.61	1.26	28
	Cont	1.45	.96	75
	Prep	1.41	.99	105
	Act	1.22	.67	150
	Main	1.26	.71	481
	Rel	1.29	.83	92
	Total	1.30	.80	931
Lack of Partner	Pre	2.14	1.27	28
	Cont	1.95	1.13	75
	Prep	1.61	.89	105
	Act	1.50	.88	150
	Main	1.24	.60	481
	Rel	1.59	.93	92
	Total	1.44	.83	931
Insufficient Programs	Pre	1.93	1.15	28
	Cont	1.56	.78	75
	Prep	1.35	.60	105
	Act	1.31	.67	150
	Main	1.23	.54	481
	Relap	1.42	.79	92
	Total	1.33	.65	931
Lack of Support	Pre	2.07	1.21	28
	Cont	2.08	1.19	75
	Prep	1.88	.94	105
	Act	1.61	.92	150
	Main	1.25	.56	481
	Rel	1.74	.90	92
	Total	1.52	.85	931
Lack of Transportation	Pre	1.25	.84	28
	Cont	1.15	.43	75
	Prep	1.18	.58	105
	Act	1.24	.69	150
	Main	1.18	.51	481
	Relap	1.08	.34	92
	Total	1.18	.54	931

Table 10. continued

Barriers	Stage	*Mean*	*SD*	*N*
Feeling Sad or Blue	Pre	1.93	1.15	28
	Cont	2.48	1.20	75
	Prep	2.37	1.09	105
	Act	2.22	1.04	150
	Main	1.83	.87	481
	Rel	2.27	1.20	92
	Total	2.05	1.03	931

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance. Likert scale: 1 = Never, 3 = Sometimes, 5 = Always

of energy, lack of motivation, excessive cost, fear of injury, lack of skill, feeling uncomfortable, lack of partner, and lack of support.

Respondents in the Preparation stage of change reported the following barriers significantly less frequently than those respondents in the Relapse stage of change: lack of energy and acute illness/injury. Respondents in the Preparation stage of change reported the following barriers significantly more frequently than those in Relapse: lack of motivation, excessive cost, lack of skill, lack of partner, and insufficient programs.

Respondents in the Action stage of change reported the following barriers significantly less frequently than those in Relapse: lack of time, lack of energy, and lack of

Table 11. Hypothesis 4: Significant Dunnet Post Hoc Multiple Comparisons of Relapsers With Stages in Terms of Barriers

Barriers	Stage	Mean Difference from Relapsers
Lack of Time	Act	-0.33
	Main	-0.79
Lack of Energy	Pre	-0.57
	Cont	0.47
	Act	-0.41
	Main	-0.74
Lack of Motivation	Pre	0.63
	Cont	0.73
	Act	-0.44
	Main	-0.97
Excessive Cost	Pre	0.80
	Cont	0.42
Acute Illness/Injury	Pre	-0.77
	Cont	-0.55
Fear of Injury	Cont	0.27
Lack of Facilities	-	
Lack of Skill	Pre	0.74
	Cont	0.45
Feeling Uncomfortable	Cont	0.43
	Main	-0.28
Lack of Safe Places	-	
Lack of Childcare	-	
Lack of Partner	Pre	0.56
	Cont	0.36
	Main	-0.34

Table 11. continued

Barriers	Stage	Mean Difference from Relapsers
Insufficient Programs	Pre	0.50
	Main	-0.19
Lack of Support	Cont	0.34
	Main	-0.49
Lack of Transportation	-	
Feeling Sad or Blue	Main	-0.44

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance.
Note. A (-) sign indicates that stage had a significantly lower score than Relapsers, whereas no sign indicates participants at that stage had a significantly higher score compared to Relapsers. Likert scale: 1 = Never, 3 = Sometimes, 5 = Always. N = 931, significance level $p < .05$.

motivation. Respondents in the Action stage of exercise change did not significantly report any barriers more frequently than those in Relapse.

Respondents in the Maintenance stage of change reported the following barriers significantly less frequently than those in Relapse: lack of time, lack of energy, lack of motivation, feeling uncomfortable, lack of partner, insufficient programs, lack of support, and feeling sad or blue. Respondents in the Maintenance stage of exercise change did not significantly report any barriers more frequently than those in Relapse. In fact,

they appeared more similar to respondents in the Preparation and Action stages of exercise behavior change.

Discussion

Exercise Barrier Study Shortfalls

The present EXCUSERCISE study used retrospective recall and quantified the strength of specific barriers through Likert scales as well as frequency of occurrence across differing stages of changes to address some of the shortfalls in perceived barrier research as reported in review by Brawley et al. (1998). Information on the strength of the barrier limitation as well as the frequency of occurrence within a given time frame is not often researched. Data from studies in leisure, health, or exercise typically provide barriers via an elicitation procedure or answering questions to an investigator provided list. Frequency analysis to determine the percentage of people most commonly indicating specific barriers to exercise is the most common approach.

Relapse Stage Barriers

EXCUSERCISE Relapse stage of change respondents listed mean barrier ratings (strength) in the following order: lack of time, lack of motivation, lack of energy, acute illness/injury, feeling sad or blue, lack of facilities,

lack of support, excessive cost, lack of partner, feeling uncomfortable, lack of safe places, lack of skill, insufficient programs, fear of injury, lack of childcare, and lack of transportation. While the Canadians (CFLRI, 1995) categorized their Relapse stage of change barriers in accordance with frequency of report: time (69%) energy (59%), motivation (52%), cost (37%), illness/injury (36%), facilities (30%), uncomfortable (29%), skill (29%), fear of injury (26%), safe places (24%), child care (23%), partner (21%), insufficient program (19%), lack support (18%), and lack of transportation (17%). Both studies indicate a similar top three barriers for Relapsers: time, energy and motivation. Injury/illness is also in the top five barriers for Relapsers.

Results from across the stages of change in the EXCUSERCISE study indicate that Barrier scores increase from Precontemplation to Contemplation stage of change but then progressively decrease from Preparation to Action to Maintenance stages of change. Relapsers also had scores between those in Preparation and Action (closer to Action) stages of change. These results are similar to the 1995 Canadian (CFLRI, 1995) study where the relative importance of all barriers appears to decrease from Relapse to Action

to Maintenance stages of change. It appears that Maintainers have developed increased self-efficacy through successful negotiation of earlier stage of change barriers.

Like the Canadian study (CFLRI, 1995), data from the EXCISERCISE study indicated lack of time, lack of energy, and lack of motivation as the top excuses for Relapsers. Energy and motivation barriers were reported with great frequency across all stages in the Canadian study (CFLRI). Illness/injury replaced time as a top three major barrier in the Precontemplation stage of change in the Canadian study.

In the EXCUSERCISE study, respondents in the Maintenance stage of change reported the following barriers significantly less frequently than those in the Relapse stage of change: lack of time, lack of energy, lack of motivation, feeling uncomfortable, lack of partner, insufficient programs, lack of support, and feeling sad or blue. Respondents in the Maintenance stages of change did not significantly report any barriers more frequently than those in the Relapse stage of change. These exercise barriers can also be labeled as negative affect or mood related. It appears that the increase in associated self-efficacy occurring with advanced stages of change, improves

an individual's confidence particularly in their ability to handle personal affect related barriers.

Social Cognitive Theory and Self-Efficacy concept (Bandura, 1986, 1995) also differentiates between various barriers. One type of perceived barrier slows or stops health behaviors often involving personal (fatigue, injury) or situational (weather) factors. The second type of perceived barrier involves physical determinants (lack of facilities, exercise leader) that often prevent behavior initiatives. It would appear from the EXCUSERCISE study that Relapsers would do best to improve their adherence to exercise by focusing on the personal affect related barriers.

According to the framework for classifying reasons for exercise non-adherence developed by Meichenbaum and Fong (1993), Level III reasons consist of affective-schema. Affective-schema reflects deeply rooted, often highly emotions produced by related beliefs and feelings that influence non-adherence. Reasons for these affects often include depression, fear, helplessness, fatalism, denial, and avoidance. Level III interventions target specific belief processes and rationalizations. While one can imagine that repeated failure to resolve the same issues or

barriers might create or be more indicative of underlying psychosis requiring severe intervention, the opposite may indeed be true. Perhaps psychosis is preventing some individuals from achieving desired exercise adherence.

In either case, proper assessment of the exerciser would indicate that most reasons for non-adherence as assessed by the EXCUSERCISE survey would fall into Level II classification (Meichenbaum & Fong, 1993). Level II classification consists of self-relevant reasons that describe the respondent's perceived costs and benefits of compliance with health-related advice. Factors such as perceived barriers, concerns about negative consequences, or low self-efficacy for implementing and adhering to an exercise program explain why individuals cannot change their behavior. Level II interventions include strategies for starting and maintaining a program. Methods for increasing self-efficacy and ultimately exercise adherence are discussed in the Implications for Practitioners section of this document.

Conclusion

People who relapse from exercise back into sedentary lifestyle do have differing excuses or barriers compared to

people at other stages of changes. Generally, barrier frequency scores decrease with advancing stage of Preparation and Action (closer to Action). Specifically, Relapsers report lack of time, lack of motivation, and lack of energy as their top three excuses for lack of participation in exercise. Relapsers report significantly more barriers, particularly of the personal affect type, than do Maintainers.

Additional Analyses

All stage of change comparisons of respondents were also conducted in order to differentiate exercise determinant scores across all stages of exercise behavior change (see Tables 12 and 13). Because this set of multiple comparisons is less focused than analyses specifically comparing Relapsers to other stages of exercise change, Tukey honestly significant difference tests were calculated, which require greater mean differences for pair-wise comparisons to be significant ($p < .05$) level.

In general, self-efficacy improves or increases with higher, or advancing stages of exercise change as increases are found from Precontemplation to Contemplation stages of change and from Preparation to Action to Maintenance stages

Table 12. Additional Analyses: All Exercise Stage of Change Comparisons

	Stage	*Mean*	*SD*	*N*
Self-Efficacy	Pre	35.68	16.72	28
	Cont	41.21	11.74	75
	Prep	44.36	10.78	105
	Act	53.09	12.08	150
	Main	62.31	13.22	481
	Rel	45.85	13.06	92
	Total	54.67	15.43	931
Decisional Balance Pros	Pre	14.29	6.24	28
	Cont	19.03	4.18	75
	Prep	19.87	3.50	105
	Act	19.85	3.89	150
	Main	21.17	3.58	481
	Rel	19.64	3.77	92
	Total	20.28	4.00	931
Decisional Balance Cons	Pre	8.32	4.31	28
	Cont	9.43	3.67	75
	Prep	8.07	2.74	105
	Act	7.19	2.16	150
	Main	6.82	2.17	481
	Rel	7.14	2.63	92
	Total	7.31	2.62	931
Barriers	Pre	33.79	8.49	28
	Cont	34.60	7.73	75
	Prep	31.70	5.49	105
	Act	29.66	7.04	150
	Main	26.30	5.75	481
	Rel	30.61	5.12	92
	Total	28.77	6.78	931

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance.

Table 13. Significant Differences in Overall Exercise Determinant Scores Across Stage of Exercise Change

Determinant	Stage of Exercise Change					
	Pre	Cont	Prep	Rel	Act	Main
Self-Efficacy						
Pre			+	+	+	+
Cont					+	+
Prep	-				+	+
Rel	-				+	+
Act	-	-	-	-		+
Main	-	-	-	-	-	
Decisional Balance Pros						
Pre		+	+	+	+	+
Cont	-					+
Prep	-					+
Rel	-					+
Act	-					+
Main	-	-	-	-	-	
Decisional Balance Cons						
Pre						-
Cont			-	-	-	-
Prep		+				-
Rel		+				
Act		+				
Main	+	+	+			

Table 13. continued

Determinant	Stage of Exercise Change					
	Pre	Cont	Prep	Rel	Act	Main
Barriers						
Pre					-	-
Cont			-	-	-	-
Prep		+				-
Rel		+				-
Act	+	+				-
Main	+	+	+	+	+	

Note. Pre = Precontemplation, Cont = Contemplation, Prep = Preparation, Rel = Relapse, Act = Action, Main = Maintenance. A (-) sign indicates that stage had a statistically significantly lower score ($p < .05$) than all other stages, whereas a (+) sign indicates participants at that stage had a statistically significantly higher score ($p < .05$) compared to all other stages for 931 participants.

of change. Relapsers report Self-Efficacy scores that are similar to those individuals in the Action stage of change. Similarly, Decisional Balance Pros score improves or increases with advancing stages of change. People in the Maintenance stage of change report the highest Pros score. Relapsers have a similar Decisional Balance Pros score to those in Preparation and Action stages of change.

Decisional Balance Cons score increases from Precontemplation to Contemplation stage of change prior to becoming progressively lower in the Preparation, Action, and Maintenance stages of change. Respondents in Relapse display similar scores to those respondents in the Action stage of exercise change.

Overall Barrier scores increase from Precontemplation to Contemplation stages of change but decrease progressively from Preparation to Action to Maintenance stages of change. Relapsers report scores between those in Preparation and Action stages of change (closer to Action).

Summary of Supplemental Analyses by Stage of Exercise Change

Self-Efficacy scores of Precontemplators were significantly lower than those respondents in Preparation, Relapse, Action, and Maintenance stages of change. They had lower scores than Contemplators, Preparers, Relapsers, and those in Action and Maintenance stages of change for Decisional Balance Pros. Precontemplators scored higher than those respondents in the Maintenance stage of exercise change for Decisional Balance Cons, as well as higher than those in Action and Maintenance stages of change for Barriers scores.

Contemplators scored significantly lower than those respondents in the Action and Maintenance stages of change on self-efficacy. They scored higher than Precontemplators and lower than respondents in the Maintenance stage of change for Decisional Balance Pros. Contemplators scored higher than individuals in Preparation, Relapse, Action,

and Maintenance stages of change in terms of Decisional Balance Cons as well as for Barriers to exercise score.

Respondents in the Preparation stage of exercise change scored significantly higher when compared to Precontemplators yet significantly lower than respondents in the Action and Maintenance stages of change for self-efficacy. They scored higher than Precontemplators and lower than Maintainers for Decisional Balance Pros score. Respondents in Preparation stage of change scored higher than Contemplators and Maintainers for Decisional Balance Cons while lower than Contemplators and higher than Maintainers for Barriers to exercise.

As reported earlier, respondents in Relapse stage of change scored significantly higher than Precontemplators and lower than those in Action and Maintenance stages of change for self-efficacy. They scored higher than Precontemplators and lower than Maintainers in Decisional Balance Pros. Relapsers scored lower than Contemplators Decisional Balance Cons as well as for barriers to exercise. Relapsers also scored higher than Maintainers in terms of barriers to exercise.

Respondents in the Action stage of exercise change scored significantly higher than Precontemplators,

Contemplators, Preparers, and Relapsers and lower than Maintainers for self-efficacy. They also scored higher than Precontemplators and lower than Maintainers for Decisional Balance Pros. Respondents in Action stage of change scored lower than those in the Contemplation stage of change for Decisional Balance Cons. Those in Action also scored lower than Precontemplators and Contemplators, and higher than those in Maintenance for Barriers to exercise.

Respondents in the Maintenance stage of exercise behavior change scored significantly higher than all stages of change for self-efficacy and Decisional Balance Pros. They scored lower than those in Precontemplation, Contemplation, and Preparation stages of change for Decisional Balance Cons. Those in Maintenance scored lower than all stages for Barriers.

General Discussion

This EXCUSERCISE study attempted to define the exercise Relapse stage of behavior change for excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population. Better stage of change identification may result in improved adherence as more appropriate interventions are tailored to meet a

respondent's current stage of readiness for change in their exercise health behavior habits.

The average length of a Relapse was 4 months and occurred two times a year. Most health benefits derived from regular exercise disintegrate with 2 to 8 months of inactivity. Because of the duration of inactivity during Relapse, strategies aimed at reducing the length of Relapse are necessary.

Data from the EXCUSERCISE study indicated the following stage of exercise change distributions: 3% in Precontemplation, 7.9% in Contemplation, 11.4% in Preparation, 16.2% in Action, 51.4% in Maintenance, and 10% in Relapse. While the number of regular exercisers is comparable to what is found in the exercise literature, it is far greater than the national norms (15%) reported by the U.S. Surgeon General (USDHHS, 1996). Part of the discrepancy in the incidence of Relapse can be explained by participant self-selection with some portion due to stage of change classification.

Better exercise stage of change classification, especially incorporating the Relapse stage of change, has important practical as well as theoretical implications. Relapsers appear to be most similar to people initiating or

adopting exercise (i.e., Preparation and Action stages of change). To date most studies have not attempted to classify Relapse as an exercise stage of change. Limited previous research has implied that Relapsers are like Precontemplators or Contemplators, which clearly does not appear to be the case, as exercise Relapsers appear most similar to respondents in Preparation and Action stages of exercise behavior change. Increasing the number of intrinsic reasons or motives for participation in exercise while simultaneously decreasing the number of barriers or excuses for lack of participation is thought to result in increased self-efficacy, less frequent and lengthy relapse, leading to better adherence to regular exercise.

It was determined that the Self-Efficacy measures had three times the effect of Decisional Balance Pros in determining stages of change amongst all the stages of change. The largest single determinant between a Relapser and a Maintainer resided in terms of self-efficacy. When comparing Relapsers to other stage of change groups, three of the five comparison stages of change returned significant results, rendering the Self-Efficacy scale the most powerful tool in this study at predicting differences between stages of change.

Relapsers should be treated as a separate stage of change. Prior research (Velicer et al., 1998) indicates that Relapsers may fall back to Contemplation or Preparation stages of change. EXCUSERCISE results indicate that Relapsers are closer to those respondents in the Preparation and Action stage of change in terms of self-efficacy, motives and barriers. This has considerable implications in developing appropriate strategies to reduce or minimize the length of a lapse from physical activity. Relapsers need not be treated like those individuals who in previous health behavior change studies regressed further to Precontemplation and Contemplation stages of change. Treatment strategies involving behavioral components should take precedence over cognitive processes Velicer et al., 1998).

The use of the Internet as a method for scientific data inquiry has advantages in terms of attracting large numbers of respondents in a relatively short period of time. Disadvantages tend to skew the respondents toward that of a sample of convenience or self-selection and of similar interest.

Implications for Researchers

A discussion of website access and data collection processes is addressed in this section. Recommendations for the web dissertation process are also included.

Schmidt (1997) concluded that there are many benefits to publishing ones survey on the world-wide-web. Perhaps the most notable and obvious benefit is access to a large population of individuals. Other benefits include savings in both time and money for survey researchers and the ability to present survey information in formats that were previously difficult to achieve. While it is true that the potential to reach a larger population in a short period of time is achievable, this far reaching grasp does not come without costs in both time and money.

Sending a poll or survey by e-mail is done with great frequency by companies on their intranet, surveying everything from corporate policy, bonus allocation preferences, to health promotion program offerings. Popular web sites like CNN.com, MTV.com, and Time.com invite web surfers to visit their site and participate in non-scientific, often future marketing use, surveys, or polls. In retrospect, the EXCUSERCISE study would have been completed sooner had just the survey been distributed

to a sample of convenience. Developing the companion educational web site to provide exercise adherence strategies for future or current exercisers required significant time and cost. Learning to use the web editor tool (Microsoft Front Page) took considerable time and energy. The learning and creation of the survey tools (requiring two different tools used at two different times) also was time consuming and costly.

The creation of the EXCUSERCISE web site took many hours (too numerous to count), learning how to use the tool as well as loading each page with content and testing for web browser compatibility.

The originally picked free web survey host for academics, WebSurveyAssistant.com, had to be switched to another site just as the survey was near completion and ready to go online because during survey testing some insurmountable glitches could not be overcome. The reason the web site service is free is that there is very limited technical support, so when problems occurred help response time was slow and eventually nonexistent. This led to the employment of a paid web survey-hosting site, Keysurvey.com. The customized (other options available) $400 cost allowed for up to 1,000 responses during a six-

month time frame. Technical support was very responsive and the web survey tool easy to utilize. There were a few glitches associated with this service that were rectified. Some initial survey respondents were unable to enter beyond the first or second page due to java script (web language) problems as some respondent computers contain older versions of the Internet Explorer web browser (the platform for the computer to use for access to the world wide web). The technical support staff was able to add some coded language to help with the interface. It is unknown how many more respondents may have participated but about a dozen potential respondents expressed desire to participate and e-mailed me about their inability to gain entrance to survey located on the web site.

The other problem occurred during the critical phase of transfer of data to SPSS for analysis. Although there was a self-transfer function available on the web survey host site, it was inoperable. To remedy the situation the Keysurvey.com host e-mailed the data in a file. It then opened and loaded smoothly for import to SPSS for analyses manipulations.

Due to the extra time that was spent on the second survey form creation, an immediate response group data to

date report was never created per original informed consent. In order to provide more data security, names and e-mail addresses were not collected. Having those addresses now would allow the group data report to be sent as follow-up. For those many respondents who did forward an e-mail regarding their interest in the study's results, they were directed to return to the EXCUSERCISE web site at the end of the summer at which time aggregate group data will be added at that time.

Searching for the right Web Hosting service was time consuming, but provided some fairly inexpensive options. Hosting services are priced by amount of space and web site functions. EXCUSERCISE was able to find a home at FeaturePrice.com for a one time $50 set up fee and $4.95 monthly fee (must be purchased in yearly intervals). The host allows one to update content as frequently as desired and uploads extremely quickly. Unfortunately, a recent development has put FeaturePrice out of business, seemingly a common occurrence in the web site provider market contraction. FeaturePrice made arrangements with another provider to take over the EXCUSERCISE account, albeit at a higher fee. As of this publication there are two months free. The site will probably be moved to a less expensive

host as it is the author's intention to place a results section on the web site once the dissertation is completed. An overall pleasant and rewarding experience, web site development can create a visual representation of one's dissertation work in a format that is entertaining, yet educational.

Implications for Practitioners

The EXCUSERCISE data suggest that Relapse is clearly distinguishable from beginning stages of change for exercise and Maintenance stage of change; and, the convention may be to assume that in Relapse, people regress to Precontemplation or Contemplation stages of change, which is clearly not the case. It is therefore imperative to distinguish individuals in Precontemplation and Contemplation stages of change from those in Relapse stages of change. In the Precontemplation and Contemplation stages of change, intervention largely focuses on the cognitive processes of change that allows persons to discover a benefit to change their behavior. Relapsers, being similar to individuals in Preparation and Action stage of change exercisers, need more help with behavioral strategies that will address injury and negative-affect related barriers. Accordingly, interventions should

attempt to increase exercise self-efficacy and promote relapse prevention. To improve self-efficacy (Bandura, 1985) or ones belief in his/her ability to adhere to an exercise regimen, practitioners should try the following: provide a mastery experience, vicarious experience, verbal persuasion, and physiological arousal.

To provide a mastery exercise experience, practitioners may try the following: break goals into concrete steps, design programs to ensure success, facilitate thrice weekly workouts, and discuss achievement of daily (process and outcome) goals. To provide a positive vicarious exercise experience, practitioners may try the following: model proper exercise form and technique, as well as provide cues and images for respondents to visualize as they are performing different exercises.

To provide a positive verbal persuasion experience, practitioners may try the following: provide feedback, provide biofeedback, provide affirmations, and provide encouragement/review sessions. To provide a positive physiological experience, practitioners can increase exerciser awareness regarding: proper heart rate training

zones, muscle soreness vs. joint soreness, muscle failure, and high rep and low weight vs. low rep and high weight educational information.

To address perceived barriers, practitioners should utilize relapse prevention programming. Identify specific situations that may pose a problem for a potential exerciser in terms of lapse and relapse. This can be accomplished by use of self-monitoring records, self-efficacy ratings, and descriptions of past relapses, as well as an assessment of an exerciser's coping skills or capacity to respond in high risk situations.

Anticipate actual or potential relapse by developing a Relapse stage of change prevention plan including: countering strategies, larger support system, change of environmental factors, and multiple modes of exercise. It would also be wise to anticipate and prevent relapses during and after times of stress: develop better stress/time management skills, cognitive reframing (create a more balanced lifestyle), anger/conflict management, depression treatment, and assertiveness training.

By planning for Relapse stage of change with multiple options, good social support, mental rehearsal, as well as implementation of counter measures, an exerciser can reduce

the amount of down time, preventing a lapse from becoming a full-blown relapse. When an individual has the experience of coping effectively with one high-risk situation after another, the probability of future relapse decreases because there is an increase in ones self-efficacy, or belief he or she can successfully adhere to a desired exercise regimen.

Relapse Prevention Therapy intervention strategies can be grouped into three categories: coping skills training, cognitive therapy, and lifestyle modifications. Coping skills training strategies include both behavioral and cognitive techniques. Cognitive therapy procedures are designed to provide clients with ways to reframe their sedentary lifestyle and exercise habit change process. Mastery develops as learning experiences are expected and appropriate responses planned. Lifestyle modification strategies such as meditation and spiritual practices are designed to strengthen a client's overall coping capacity. One review (Irvin et al., 1999) of the research on relapse prevention suggested that exercisers be trained to: identify high risk situations, improve ability to avoid and/or cope with such situations, emphasize the positives associated with completing an exercise session, plan for

inevitable slips, set flexible exercise maintenance rules, and choose enjoyable exercise activities. The companion web site of the present study has a section offering strategies to exercisers who often relapse from regular exercise.

To address turning short-term external exercise adoption into long-term internal exercise maintenance the practitioner should encourage the exerciser to develop process (internal rewards) in addition to their outcome (external rewards). External/extrinsic motivation is most useful in the initial stages of exercise adoption (Deci & Ryan, 1985). Internal/intrinsic motivation is required to move initial exercise adoption into long-term maintenance/adherence.

To assist in successfully implementing exercise programs, practitioners may employ the SMART goal setting outline: Simple, measurable, adjustable, realistic, and time outlined steps. For motivation, exercisers should be forewarned that enjoyment benefits may not materialize in the short-term, so focusing on bodily benefits is realistic, but like children find some activities that provide enjoyment/fun, at least some of the time.

Finally, help exercisers develop wider and deeper support systems to minimize the length of time spent in the Relapse stage of change. Try to incorporate friends, family, significant others, and coworkers into activities that can be done at work, school, a gym, in the home, indoor, outdoor, winter, summer, in a group, or alone. Have a daily A, B (back-up), C (tertiary auxiliary) plan that by design will insure some type of participation. By reducing time spent in Relapse stage of change, exercisers can maintain higher levels of fitness and need not continually start over.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

The purpose of this study was to define the exercise Relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population. The summary, conclusions and recommendations for future research, is presented in the following sections: (a) Summary, (b) Conclusions, and (c) Recommendations for Future Research.

Summary

The purpose of this study was to define the exercise relapse stage of behavior change in terms of excuses or perceived barriers, self-efficacy, decisional balance, and motives in the adult population. Nine hundred and thirty-one men (37%) and women (63%) from a sample of convenience responded to the 68 question online Internet survey from six global regions. The majority (96%) of the respondents were from North America and specifically the Northeastern portion of the United States.

Ninety-two (10%) respondents were categorized into the Relapse stage of change based on the definition of "regular exercise" participation. The average lapse lasted approximately 4 months and Relapsers restarted their exercise program about two times a year.

As hypothesized, Replapsers could be reliably differentiated from other stages of change on a variety of exercise determinants. In general and with few exceptions, Relapsers had significantly more Pros for exercise, higher exercise self-efficacy and exercise motivation scores, and fewer Cons for exercise and exercise barriers than respondents classified into Precontemplation and Contemplation stages of change. However, Relapsers had significantly less favorable scores on these determinants when compared to respondents in the Maintenance stage of change. These data suggest that Relapsers are more similar to people in the Preparation and Action stages of change than they are to people in the relatively more advanced Maintenance stage of change and lower than respondents in the Precontemplation and Contemplation stages of change. Individuals in Preparation and Action stages of change responded best to behavioral initiatives.

Further analysis revealed findings that more specifically characterized Relapsers across exercise determinants. First, the top five barriers reported by Relapsers may be classified as being mood or negative affect related and as a strong injury barrier component. When combined, the injury barrier and negative affect barriers accounted for 22% of variance.

Second, across exercise determinants, the Self-Efficacy scores of Relapsers exhibited the greatest significant differences from respondents in other exercise stages of change. The Self-Efficacy scores were closest to those respondents in the Preparation stage of change, while furthest from those in the Maintenance stage of change. This was particularly true in reference to negative affect, excuses, and resistance from others.

Relapsers have the same motives as those respondents in the Preparation and Action phase of exercise change. Notably Relapsers differed those in Maintenance in terms of intrinsic motivations such as stress management, revitalization, enjoyment, challenge, and positive health. Intrinsic motives are associated with long term exercise adherence.

Relapsers report lack of time, lack of motivation and lack of energy as their top three excuses for their lack of participation in exercise. Relapsers report significantly more barriers, particularly of the personal affect type, than do Maintainers.

Better identification of Relapsers will help tailor appropriate interventions. Relapsers should be treated like respondents in Preparation and Action stages of change rather than the Contemplation stage of change. Increasing the use of behavioral processes along with the number of intrinsic motives (particularly enjoyment) for participation in exercise while simultaneously decreasing the number of personal mood affect and injury barriers for lack of participation may result in increased self-efficacy, reduced length of relapse, and better adherence to regular exercise.

Conclusions

Conclusions will be presented in reference to the four proposed hypothesis questions.

1. People who relapse from exercise back into a sedentary lifestyle have different determinants from people at other stages of exercise behavior change. Generally, Relapsers differ significantly from other stages of change

in terms of decisional balance, self-efficacy, motives, and barriers. Specifically, a Relapse lasts for 4 months and occurs twice a year. Ten percent of EXCUSERCISE respondents were found to be in this stage of change.

2. People who relapse from exercise back into sedentary lifestyle have differing motives for exercise participation compared to people at other stages of change. Generally, Relapsers were similar to respondents in Preparation and Action stages of change in terms of motivations to exercise. Most specifically, a significant difference among Relapsers and those in the Maintenance stage of change was noted. Maintainers reported many more motives in quantity as well as quality, especially intrinsic motives such as enjoyment.

3. People who relapse from exercise back into sedentary lifestyle have differing levels of self-efficacy compared to people at other stages of change. Generally, Self-Efficacy scores and decisional balance Pros increased with advancing stage of change. Specifically, Relapsers' Self-Efficacy scores were closest to respondents in the Preparation stage of change, while furthest from those in the Maintenance stage of change, particularly in reference to negative affect, excuses, and resistance from others.

4. People who relapse from exercise back into sedentary lifestyle have differing excuses or barriers compared to people at other stages of changes. Generally, barrier frequency scores decrease with advancing stage of change of Preparation and Action. Specifically, Relapsers report lack of time, lack of motivation, and lack of energy as their top three excuses for lack of participation in exercise. Relapsers report significantly more barriers, particularly of the personal affect type, than do Maintainers.

Recommendations for Future Research

Future studies into stages of change, barriers, self-efficacy, and motives pose many interesting opportunities.

1. Researchers may wish to incorporate the processes of change (five experiential and five behavioral processes) that respondents utilize to help effect change. Different stages of change contain differing amounts of these processes of change. Theoretically, and with some historical data, the behavioral processes are utilized with greater frequency in the higher (Action and Maintenance) stages of change (Velicer et al., 1998). These studies should determine the impact of differing behavioral strategies on the duration and frequency of relapse.

2. Future research protocols may explore the possibility that those exercisers that exhibit more intrinsic and extrinsic motives may indeed have better exercise adherence rates. It is this author's contention that those individuals who maintain a regular exercise program should develop multiple reasons for exercise participation. In fact, "the more the merrier" might be re-written as "the more the maintainer."

3. It would be interesting to geographically analyze other populations. Does better weather or climate improve adherence and reduce the length and frequency of relapse? What do the effects of time of year or season, Winter, Spring, Summer, or Fall, have on the Relapse stage of change.

4. The effect of socio-cultural patterns such as ethnicity, race, or religion on the Relapse stage of exercise change needs to be determined.

5. The effects of age when relapse first occurs and its influence on the characteristics and determinants of the Relapse stage of change needs to be determined.

6. Perhaps of even greater importance would be the effect life stages (college, first job, just married, first child, divorce, death of spouse) have on the length and

frequency of relapse. Developing strategies to effectively deal with individuals in differing stages of life may yet be the most practical and simple approach.

7. The sample of convenience led to a highly educated, physically active Northeastern American sample. Different participant recruiting methods designed to obtain a sample more representative of the general population in terms of education and exercise adherence levels may be employed. Soliciting local newspapers to write an article may represent the general population of an area better. A monthly or weekly national magazine publication may better spread the word geographically and represent a national population.

8. Perhaps the addition of a qualitative component to the study would allow one to better evaluate the determinants of exercise adherence. Certainly using the web to capture qualitative information would allow individuals to tell their story and eliminate interview transcriptions.

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APPENDIX A

STUDY SURVEY

I. EXERCISE STAGE OF READINESS

Regular Exercise" is defined as any planned or structured physical activity (e.g., brisk walking, group exercise class, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed a minimum of 3 times per week for at least 20 minutes per session. Exercise should be done at a level that increases your breathing rate and causes you to break a sweat.

1. WHICH STAGE OF EXERCISE BEHAVIOR ARE YOU PRESENTLY ENGAGED IN? (Please choose only one answer.)
- I have not done any regular exercise for a long time, and I have no intention of starting to exercise regularly in the near future.
- I have not been exercising regularly over the past 6 months. But I am thinking of doing so and intend to exercise regularly in the near future.
- I have not been exercising regularly over the past 6 months. But I am taking active steps (exercised some, but less than 3 times a week on most weeks) to exercise regularly in the very near future.
- I WAS exercising regularly at times over the past 12 months. I am not currently exercising regularly. I intend to resume exercising regularly in the future.
- I have recently begun exercising regularly after a period of irregular, or not exercising over the past 6 months, and I intend to continue exercising regularly.
- I have been exercising regularly for the past 6 months and I intend to continue exercising regularly

II. RELAPSE

"Relapse" refers to a total, continuous, and complete backsliding from "regular" exercise (see definition below) back into sedentary (inactive) lifestyle.
"Regular" exercise is defined as any planned or structured physical activity (e.g. brisk walking, group exercise class, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed a minimum of 3 times per week for at least 20 minutes per session. Exercise should be done at a level that increases your breathing rate and causes you to break a sweat.

2. IF YOU ARE NOT CURRENTLY EXERCISING ON A REGULAR BASIS- HOW LONG HAS IT BEEN (NUMBER OF WEEKS) SINCE YOU LAST EXERCISED REGULARLY? (If you ARE currently exercising on a REGULAR basis, then please type "0" in the box)

3. HOW MANY TIMES DURING THE PAST 12 MONTHS (YEAR) HAVE YOU STOPPED AND RESTARTED YOUR PARTICIPATION IN REGULAR EXERCISE? (Type number in box).

III. EXERCISE DECISIONAL BALANCE

This section looks at positive and negative aspects of exercise. Read the following statements and select a response in the drop box after reflecting upon how important each statement is with respect to your decision to exercise, or not to exercise in your leisure time. If you disagree with a statement or are unsure how to answer, the statement is probably not important to you. Please use the following 5-point scale:
5 = Not important
4 = A little bit important
3 = Somewhat important
2 = Quite important
1 = Extremely important

HOW IMPORTANT ARE THE FOLLOWING OPTIONS IN YOUR DECISION TO EXERCISE, OR NOT TO EXERCISE?

4. I would have more energy for my family and friends if I exercised regularly.

5. I would feel embarrassed if people saw me exercising.

6. I would feel less stressed if I exercised regularly.

7. Exercise prevents me from spending time with my friends.

8. Exercising puts me in a better mood for the rest of the day.

9. I feel uncomfortable or embarrassed in exercise clothes.

10. I would feel more comfortable with my body if I exercised regularly.

11. There is too much I would have to learn to exercise.

12. Regular exercise would help me have a more positive outlook on life.

13. Exercise puts an extra burden on my significant other.

IV. EXERCISE EFFICACY

This part looks at how confident you are in your ability to exercise when other things get in the way.
Read the following items. Enter in the box the number that best expresses how each item relates to you in your leisure time.
Please answer using the following 5-point scale:
1 = Not at all confident
2 = Somewhat confident
3 = Moderately confident
4 = Very confident
5 = Completely confident

HOW CONFIDENT ARE YOU THAT YOU WILL CONTINUE TO EXERCISE UNDER THE FOLLOWING CIRCUMSTANCES?

14. I am under a lot of stress.

15. I am depressed.

16. I am anxious.

17. I feel I do not have the time.

18. I am busy.

19. I am alone (no one else to exercise with).

20. I have to exercise alone.

21. My exercise partner decided not to exercise that day.

22. I do not have access to exercise equipment.

23. I am traveling.

24. My gym is closed.

25. My friends do not want me to exercise.

26. My significant other does not want me to exercise.

27. I am spending time with friends or family who do not exercise.

28. It is cold outside.

29. I do not feel like it.

30. It's raining or snowing.

V. EXERCISE MOTIVES

Below are a number of reasons people often give when asked why they DO exercise.
Whether you currently exercise regularly or not, please read each reason and indicate by selecting the response in the drop box that best reflects how often YOU feel the reason is true for YOU personally, or would be true for you personally if you did exercise.
Remember, we want to know why YOU personally choose to exercise, or might choose to exercise, not whether you think the statements are good reasons for anybody to exercise.
1 = Never
2 = Rarely
3 = Sometimes
4 = Often
5 = Always

WHY DO YOU, OR WOULD YOU EXERCISE REGULARLY? HOW OFTEN IS THAT A REASON FOR YOUR PARTICIPATION?

31. Stress Management.

32. Revitalization.

33. Enjoyment.

34. Challenge.

35. Social recognition.

36. Affiliation.

37. Competition.

38. Health pressures.

39. Ill-health avoidance.

40. Positive health.

41. Weight management.

42. Appearance.

43. Strength and endurance.

44. Nimbleness.

VI. EXERCISE BARRIERS

Below are a number of excuses people give when they are asked why they do NOT exercise. Whether you currently exercise regularly or not, please read each excuse carefully and indicate, by selecting the response in the drop box that best reflects how often YOU feel the reason is true for YOU personally. Congratulations if you exercise "all the time" - please indicate the occasional reason why you may not exercise.
Remember, we want to know why YOU personally choose NOT to exercise or might choose NOT to exercise, not whether you think the statements are good excuses for anybody NOT to exercise.
1 = Never
2 = Rarely
3 = Sometimes
4 = Often
5 = Always

WHY DO YOU NOT (DON'T) EXERCISE REGULARLY? HOW OFTEN IS THAT A REASON FOR YOUR LACK OF PARTICIPATION?

45. Lack of time.

46. Lack of energy.

47. Lack of motivation.

48. Excessive cost.

49. Illness/injury.

50. Lack of facilities nearby.

51. Feeling uncomfortable (self-conscious).

52. Lack of skill/knowledge.

53. Fear of injury.

54. Lack of safe places.

55. Lack of childcare.

56. Lack of partner.

57. Insufficient programs.

58. Lack of support.

59. Lack of transportation.

60. Feeling sad or "blue"

VII. DEMOGRAPHICS

Please complete the following brief demographic information. Note: To protect your privacy no personal identifying information is being collected.

61. Gender (select response from pull down box below).

62. Age (years old as of today) (type in numerical age in box).

63. Ethnicity (select response from pull down box below).

64. What global geographic area do you currently live in, or live closest to? (select response from the drop down box).

65. State of Present Residence - If you are living in the U.S. - what state do you presently reside in? (select response from pull down box below).

66. How did you hear about this survey? (check all that apply).
-word of mouth (friend, co-worker, family member)
-press release
-random surf of the web
-web search engine
-newspaper/magazine article
-e-mail

THANK YOU! For your time, effort and energy in completing this survey. Please submit the data now. Please return to the main web site for additional information on exercise adherence and updated survey results. Feel free to utilize the web site as a personal or professional reference tool.

APPENDIX B

CONSENT FORM

EXCUSERCISE: Defining the Exercise Relapse Stage of Behavior Change via an e-based data collection

Bruce Cohen, M.S. (Ph.D. Candidate)
www.EXCUSERCISE.org

Purpose of research

Roughly 80% of the general population in the United States of America does NOT participate in exercise or physical activity with enough frequency and/or intensity to reap the health benefits that health professionals claim are there for the picking. Why such poor adherence? Exploration into the use of the web to collect data on your personal exercise and physical activity experiences, particularly in reference to the initial adoption, long-term maintenance, relapse prevention, perceived barriers, and reasons, or excuses you may use to limit participation in physical activity will be examined. This web site intends to encourage you and educate you toward a better understanding of the voluntary health behavior known as exercise, while providing practical examples and resources. In addition, it is hoped that web site research will revolutionize the way participation and research data can be collected.

Selection of Participants

The EXCUSERCISE.org web site is constructed for the purpose of education and research. Education on behavior change, specifically exercise, will be provided. Participation in the proposed research questionnaire is optional. You may have arrived at the EXCUSERCISE.org web site by one of the following methods:

1. Web browser search engine. Key words like "exercise," "fitness," "adherence," "excuses," "change," "behavior modification" were provided to the web site server host to enable search engines to locate and list this site more readily when subject or topic interest was generated by you the web surfer/user.
2. Word of mouth. You may have been informed of this study's design via word of mouth from friends, family, co-workers.
3. Press release. You may have seen a press release announcement sent out to fitness/health publications, list serves, or web sites.

This study will focus on the collection of data from those members of the adult population with access to the Internet/World Wide Web. The use of minors as participants

will be discouraged by placement of verbal warnings. Participants will be required to read and accept the consent form prior to gaining access to the questionnaire.

General experimental procedures

Participation in this project is entirely on a voluntary basis. Should you decide to participate please indicate your acceptance of this informed consent by selecting the "I accept" button located at the conclusion of this form. Should you not wish to participate select the "I do not accept" button to leave the questionnaire section and return to the main page of the EXCUSERCISE.org web site.

Selecting the "I Accept" button will link you to the server where the research survey form resides. Please be patient as this link may take several seconds to load, but will open directly to the survey.

The EXCUSERCISE survey consists of 100 questions and will take approximately 10 to 15 minutes to complete. Prior to the commencement of each section there are directions instructing you how to answer the section's questions. Please answer all questions, as only completed questionnaires will be tallied. You will be allowed to fill out the questionnaire only once.

Upon survey completion you will have the option of viewing anonymous group data results. Select "results" in order to view group data report. The results will be further analyzed in the attempt to decipher any trends or statistically significant occurrences. Once completed, the study results and interpretation will be posted on the EXCUSERCISE.org site home page.

Web Site Educational Component

Regardless of participation in the study, you may browse the web site for information on healthy behavior change and exercise adherence strategies to counter your favorite excuses. You are encouraged to return to the EXCUSERCISE.org web site as many times as you wish in order to use its contents as a resource.

Risks

There are no physical dangers in the participation of answering the questionnaire. You may be alerted to dissimilar survey results when presented with the optional

group data report. The educational information for review on the EXCUSERCISE.org web site is scientifically sound and in line with accepted standards of care. In accordance with the American College of Sports Medicine's recommendations, you are encouraged to seek physician clearance prior to exercise program commencement, in addition to follow-up care for any injuries. Specific exercises and individualized exercise "prescriptions" will not be dispensed to participants through this research project. Only generalized information will be provided. There are no long-range risks to you, the participant, other than those risks self-imposed through a sedentary lifestyle.

Benefits

No monetary compensation will be offered. Educational information on exercise and behavior modification/change will be available for your reference. Upon completion of the questionnaire you will be able to view an updated (with your responses tabulated) group data report. From this you may gain further insight about yourself compared to other questionnaire respondents. It is my hope that you will gain a greater understanding into the psychosocial elements of behavior modification and the process of change as it relates to exercise. Sample practical applications and strategies designed to counter the excuses utilized or generated to avoid physical activity or exercise are displayed on the EXCUSERCISE.org web site.

Confidentiality

The questionnaire form and data will be hosted on a secure web site. This web site specializes in the collection and reporting of data. The web server utilizes the latest technology to secure data. Their patented software scans potential participant's e-mail addresses in search of duplicate entries in order to avoid multiple data entries from one participant. Subject anonymity is maintained, as no personal identification data will be collected. City and zip codes will be used to identify geographic regions for comparison analysis.

Disclaimer/Withdrawal

The decision to participate, or not to participate in this study is entirely up to you. You are free to withdraw from the study at any time. Non-participation in the research or withdrawal from this research study will not prejudice

future interactions with the researcher or Temple University. To withdraw from the study, simply select the "back" icon on your web browser. This will bring you back to the main page of the EXCUSERCISE.org web site where you may continue to review its contents, or exit from the site if you so desire.

Injury/Complications
No threat of injury exists.

Subject rights
"I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of the Vice Provost for Research of Temple University by phoning 215-707-7460." In addition you may contact Dr. Michael Sachs, professor, Temple University, 215-204-8718.

Questions
Should you have any questions you can contact the primary researcher in this study, Bruce Cohen, by going to the "Contact this Site" bar located on the bottom of the site home/main page, or 781-768-0940. All questions will be answered. Comments, suggestions, and recommendations are appreciated.

Thank you for agreeing to participate in this study. Please view the data results section for the aggregate data report upon completion. Please utilize this web site as a resource in your quest for an active healthy lifestyle.

Healthily & Heartily,

Bruce S. Cohen, M.S.