AN EVALUATION OF A HOME-BASED INTERVENTION, BASED ON THE SOCIAL-COGNITIVE THEORY, TO PROMOTE PHYSICAL ACTIVITY IN ADULTS.

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University.

By.

Melinda K. Everman-Moore, M.S.

The Ohio State University
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Dissertation Committee:
Professor Rick Petosa, Advisor                                                Approved by
Professor Janet Buckworth
Professor Tom Bishop

College of Education and Human Ecology
ABSTRACT

The purpose of the study was to evaluate the effectiveness of the Take Control intervention to improve physical activity rates. A quasi-experimental, non-equivalent comparison group research design was used. A standard educational intervention, Just Move, was implemented to act as a comparison group for the Take Control intervention. The Take Control intervention was based on the Social Cognitive Theory (SCT). Specifically the constructs of self-regulation, self-efficacy and social support were targeted. Participants in the Take Control intervention received at their home, a series of self-guided worksheets that were tailored to address a specific SCT construct. Both programs were a six-week, home-based intervention that was designed to increase days of moderate and vigorous activity among adults. Three evaluation techniques were utilized. The first evaluation technique, behavioral impact evaluation, analyses the impact the intervention had on days of physical activity. The second evaluation technique, construct validation of the treatment, links intervention components to changes in the targeted SCT constructs. The third evaluation technique, process evaluation, measures if the intervention was implemented as intended. The study revealed that both groups significantly improved days of physical activity from pretest to posttest. Of the three SCT constructs targeted, only self-regulation increased from pretest to posttest. This study adds to the body of literature. It one of the few home-based studies that implements theoretical constructs. This study also supports that a minimal contact home-based intervention can impact days of physical activity as well as self-regulation skills.
Dedicated to Family:

Aram, Lleyton, and Brendan Moore
ACKNOWLEDGMENTS

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I would like to thank my mother, Sandy, for her instrumental and emotional support. I would also like to thank Shelley & Roger for their support. I would like to thank Dana and Rachel for their lifetime friendship.

Most of all I would like to thank my husband, Aram. Thank you for supporting me and always believing in me. Thank you, Brendan and Lleyton. You are my inspiration.
VITA

October 27, 1972.................................................... Born: Dayton, Ohio
1996................................................................. B.S., Health Education & Promotion, The Ohio State University
1998................................................................. M.S., Health Sciences, Ball State University
1998................................................................. Health Educator Middletown Regional Hospital
2000 – 2004........................................................ Graduate Assistant The Ohio State University
2004 – Present................................................ Adjunct Faculty, The Ohio State University-Marion Capital University

FIELD OF STUDY

Major Field: Education

Area of Emphasis: Health Education/Health Promotion
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CHAPTER 1

INTRODUCTION

Physical activity is important for the prevention of many chronic conditions and diseases, such as heart disease, high blood pressure, and diabetes. Although the benefits of physical activity are well established, few adults engage in adequate amounts of physical activity to gain health benefits. Furthermore, gaps remain in understanding the most effective way to increase physical activity behavior (King, Haskell, Taylor, et al., 1991).

Structured or group-based exercise programs have been demonstrated to have a positive impact on exercise adherence and maintenance. A limitation of structured-exercise programs is that those programs require a fitness instructor and the participant to be a paying member of a facility. The structured-activity approach to physical activity can be expensive and time consuming (King et al. 1991, 1995). In the literature, home-based physical activity programs are characterized by a self-directed program in which participants are not required to attend a structured exercise class at a fitness facility. Research indicates that home-based programs can be successful in increasing physical activity (Gossard, Haskell, Taylor, Mueller, Rogers, Chandler, Ahn, Miller, & DeBusk, 1986; Oman and King, 1998; King, Haskell, Taylor, Kraemer, and DeBusk, 1991; Garcia and King, 1991; Heesch, Masse, Dunn, Frankowski, and Mullen, 2003). However, a limitation in the home-based physical activity literature is that the many of the articles reviewed compared a structured exercise program to a home-based exercise program. Few studies reviewed (5 out of 16) utilized any theoretical constructs.
In the literature “home-based” refers to the exercise prescription that is being implemented. A limitation of home-based literature is that majority of studies compare a structured exercise program (gym-based) to a home-based exercise regimen. In that situation, each group is told what activity to perform, at what intensity, and for how long. Subjects are not given a choice of mode or intensity of activity. Another limitation of the home-based literature is a lack of behavior modification type of interventions. There is little focus on implementation of a cognitive-behavior modification intervention. In the present study, “home-based” refers not only to the type of physical activity that was encouraged, but also the method of intervention. Instead of participants attending a structured class in which cognitive-behavioral modification strategies are discussed. The “classroom” is being brought to the participants in a form of self-guided worksheets.

The uniqueness of the present study is that exercise regimens encouraged are consistent for both groups. The difference between the interventions is the level of theory implemented. To the author’s knowledge, this approach has not been conducted.

This chapter discusses recommended level of physical activity and rates of adult physical activity. This chapter also briefly discusses construct validation studies, home-based studies, and studies that are used educational material from the American Heart Association. Furthermore, purpose of the study, significance of the study, design of the study, description of the study, limitations of the study, and definitions are discussed.

Recommended Level of Physical Activity

The purpose of this section is to discuss recommended levels of physical activity in adults. The relationship between quantity of activity and magnitude of cardiovascular benefit has been a topic of debate for decades. Epidemiological studies have shown a dose-response relationship between physical activity and CVD mortality rates (Rockhill, et al., 2001; Rauramaa, Tuomainen, Vaisanen, & Rankinen, 1995; Paffenbarger, Hyde, Wing, Al., and...
The 1995 NIH consensus statement and the 1996 Surgeon’s General’s Report statement states that moderate intensity activities performed by previously sedentary individuals result in significant improvement in health outcomes, such as reduction in chronic diseases (NIH, 1995; USDHHS, 1996).

If the population is less active, then moderate activity may produce enough caloric expenditure to improve health benefits, such as reduction in chronic disease (ACSM, 1998; USDHHS, 1996; NIH 1995). The ACSM states that “many significant health benefits are achieved by going from a sedentary state to a minimal level of physical activity…” (ACSM, 1998, p.4). Walking, the standard example for moderate physical activity is low-risk activity (Thompson, Buchner, Pina, et al., 2003). The American College of Sports Medicine recommends frequency of training (3-5 days/week) at an exercise intensity level of 40-60% (moderate intensity) for those individuals who are unfit (ACSM, 1998). The recommendation for moderate activity is approximately equivalent to a brisk walk at 4.8 km/hour or 3 miles/hour.

According to Healthy People 2010, approximately 40% of adults engage in no leisure-time physical activity (USDHHS, 2000). The NHIS states that “people who are currently sedentary or minimally active should gradually build up to the recommended goal of 30 minutes of moderate activity daily by adding a few minutes each day…” (NHIS, 1995, p.9). In addition, the 1996 Surgeon’s General’s Report states that “The majority of benefits of physical activity can be gained by performing moderate-intensity activities “ (USDHHS, 1996, p.46). The American College of Sports Medicine [ACSM] (ACSM, 2007) and the American Heart Association [AHA] (Thompson, Buchner, Pina, et al., 2003), the 1996 Surgeon General’s Report on Physical Activity and Health (USDHHS, 1996) and the National Institutes of Health (NIH) consensus statement (NIH, 1995,) now support that health benefits can be achieved at a lower exercise intensity. It is also believed that moderate activities are more likely to be continued than high-intensity activities (NIH, 1995).
Given the importance of regular physical activity and the low prevalence rates, moderate physical activity (specifically walking) was the encouraged form of exercise. Although it should be noted, that participants were free to choose any activity at any intensity.

**Rates of Adult Physical Activity**

The purpose of this section is to provide an overview of the rates of adult physical activity using national surveys. Data from the 1997 National Health Interview Survey (NHIS) stated that 40% of adults reported that they did not engage in leisure-time physical activity (for at least 20 minutes that caused sweating or change in heart rate (USDHHS, 2000). According to Healthy People 2010 (HP 2010), it is estimated that in 1997 (baseline) 15% of adults engage in moderate physical activity for 30 minutes, 5 or more days per week. The targeted goal for the year 2010 is to increase the percentage of adults who engage in the recommended levels of moderate physical activity to 30% (USDHHS, 2000).

Rates for vigorous activity were compared among national data. According to the 2003 Behavioral Risk Factor Surveillance Survey, 26.3% of adults reported in engaging in vigorous activity (20 minutes/3 or more days per week)(CDC, 2005). The American College of Sports Medicine recommends that adults engage in 3 or more days of vigorous activity per week. According to Healthy People 2010, it is estimated that 23% of adults engage in vigorous physical activity 20 minutes, 3 or more days per week (1997 baseline figures). The HP 2010 target goal is 30%. (USDHHS, 2000).

In summary, roughly half of the adult population reports engaging in no leisure time physical activity. No leisure time activity is a risk factor for heart disease (Pollack, 1992). To impact rates of heart disease, programs need to be developed that promote the adoption and maintenance of physical activity.
 Construct Validation Studies

Construct validation of the treatment is described as “theory-testing” (Hallam & Petosa, 2004), in which interventions are developed that are designed to target specific theoretical constructs. In essence, one is testing the “extent to which the independent variables alter what they are meant to alter” (Cook & Campbell, 1979, page 60). The method of testing construct validation is to measure the theoretical constructs at pretest (before the intervention) and at posttest (after the intervention). If the program was successful in altering the theoretical constructs, a change in those theoretical constructs should be seen between pretest and posttest.

The purpose of this section is to review articles that implemented a test of construct validation of the treatment.

Hallam & Petosa (1998) conducted an intervention study at a worksite using Social Cognitive Theory (SCT) variables. The purpose of the study was to examine the impact of a four-session worksite intervention on selected SCT variables linked to adult exercise adherence. The study measured SCT constructs of: self-regulation, self-efficacy, and outcome expectancy value. For the treatment group the self-regulation subscales of: self-monitoring increased by 16%; goal setting by 21%, social support by 10%, reinforcements by 13%, time management by 15%, and relapse prevention by 13%. However, this study had little impact on self-efficacy and outcome expectancy value. This study supports that the variable of self-regulation from the Social Cognitive Theory impacts levels of physical activity.

Grim (2003) conducted a 10 week web-based physical activity program on college students. This study compared a web-based physical activity curriculum with a traditional class-based physical activity curriculum and an introductory health curriculum. The web-based group increased physical activity at the 10-week posttest, but fell at the follow-up period. Self-regulation produced the biggest effect for the web-based group. The intervention had little impact on self-efficacy or social support.
The Hallam & Petosa (1998) study and Grim (2003) study both support that self-regulation is modifiable through a health promotion intervention. However, both the Hallam and Grim interventions did not have an impact on self-efficacy, outcome expectancy value, or social support. More research should be conducted to determine the level of implementation needed to determine change in SCT variables of self-regulation, self-efficacy, and social support.

Home-Based Studies

Home-based studies for physical activity are designed to minimize barriers to exercise, such as access to facility. The purpose of this section was to review home-based physical activity studies.

Sixteen home-based physical activity studies were reviewed. Six studies compared home-based exercise program to a structured exercise program. Five out of the six studies reported the home-based groups had greater adherence than the structured exercise group (See home-based tables in Appendix J).

Six studies described the difference between a high intensity home-based exercise regimen and a low intensity home-based exercise regimen. The studies by Garcia & King (1991) and King, Haskell, Taylor, Kraemer, and DeBusk (1991); King, Haskell, Young, Oka, and Stefanick (1995); Cox, Burke, Gorely, Beilin, and Puddey (2003) indicated that intensity level (high intensity vs. low intensity) does not impact adherence rates for home-based groups.

Project Active was a two-year randomized trial designed to evaluate the 6 month and 24-month effectiveness of two interventions to promote physical activity among initially sedentary community residents (Kohl, Dunn, Marcus, & Blair, 1998; Dunn, Marcus, Kampert, Garcia, Kohl, & Blair, 1997; Dunn, Garcia, Marcus, Kampert, Kohl, & Blair, 1998; Dunn, Marcus, Kampert, Garcia, Kohl, & Blair, 1999). One group received a traditional structured
exercise program; the other received a home-based exercise program. Results from Project Active revealed that the home-based group had greater adherence than the structured-activity group.

Of the sixteen home-based studies reviewed, only 5 attempted to measure a psychosocial variable (Garcia & King, 1991; Oman & King, 1998; Dunn, Marcus, Kampert, et al., 1997; Heesch, Masse, Dunn, Frankowski, Mullen, 2003; Wilbur, Miller, Chandler, & McDevitt, 2003). All five studies measured and concluded that self-efficacy was the strongest influence on adherence.

It is clear that home-based physical activity programs can have an impact on physical activity adherence. What is lacking is the “how”. How does one change his or her behavior? What skills are needed? The literature supports that self-regulating skills related to the SCT have an impact on activity rates. In the home-based literature, only 5 studies reviewed measured a psychosocial variable, self-efficacy. The SCT (excluding the construct of self-efficacy), has not be implemented in a home-based study. Project Active (Kohl, Dunn, Marcus, Blair, 1998) utilized concepts from the Transtheoretical Model and found the use of theory to be crucial to the adoption and adherence of physical activity. The current study adds to the body of literature by implementing several constructs from the SCT (self-regulation, self-efficacy, and social support), which is lacking in the home-based literature.

American Heart Studies

The current study utilizes educational material from the American Heart Association. The purpose of the section is to briefly review adult physical activity studies that utilize American Heart Association educational material. Four studies were found that compared a stage-based intervention to a group that received educational material from the American Heart Association (Marcus, Emmons, et al., 1998; Marcus, Bock, et al., 1998; Bock, Marcus, et al., 2001; and Blissmer & McAuley, 2002). In all studies, the stage-based group and the
American Heart Association group increased their physical activity over the course of the intervention. However, the trend was for the stage-based group to report engaging in more minutes of physical activity, as compared to the American Heart Association group.

Conclusions:

Home-based physical activity studies indicate that a home-based approach to increasing physical activity among adults is an effective method. Home-based physical activity studies revealed that the home-based physical activity group reported greater adherence to physical activity, as compared to the structured exercise program. To date, many home-based studies compare a structured exercise group (that is expected to exercise in a group setting at a fitness facility) to a home-based group (that is expected to conducted physical activity outside a structured exercise class). Other than self-efficacy, few home-based studies have utilized Social Cognitive Theory constructs. Studies from Hallam & Petosa (1998) and Grim (2003) have shown the SCT variable self-regulation can be a strong predictor of physical activity. Studies need to be conducted to determine the impact of SCT variables (such as self-regulation, self-efficacy and social support) have on adults who are participating in a home-based physical activity program.

Purpose of the Study

The purpose of the study was to evaluate the effectiveness of the Take Control intervention to promote days of physical activity among adults in a targeted neighborhood, as compared to a standard education intervention (Just Move). The Just Move intervention was implemented to act as a comparison group. Both programs were home-based interventions that were designed to increase days of moderate and vigorous activity among adults. The Take Control intervention was based on the SCT theory. Participants in the Take Control intervention received at their home, a series of self-guided worksheets that were tailored to
address a *specific SCT construct*. Each worksheet required participants to actively engage in activities that were related to the specific SCT theory construct. The Just Move intervention was a standard educational home-based physical activity program. In the Just Move intervention participants received two information-only American Heart Association brochures, “Exercise and Your Heart” and “Just Move”. The brochures discussed concepts from the Take Control intervention (See Table 3.8 and Table 3.9). However, the discussion was brief, consisting of 2-3 sentences and did not elaborate on any concept. Just Move participants were not required to act upon any material read in the either brochure. The Just Move participants did not receive any material that *specifically* addressed a particular SCT construct.

**Evaluation Techniques**

The evaluation of the Take Control and Just Move interventions was conducted by a three-level approach. The main purpose of the study was to conduct a behavioral impact evaluation for the Take Control and Just Move interventions. All participants completed a seven-day recall of physical activity at pretest (wk1), posttest (wk8), and follow-up (wk12). If the Take Control and/or the Just Move interventions were successful at increasing days of physical activity, then an increase should be seen from pretest to posttest. In essence, one is measuring the effectiveness of the intervention to increase days of physical activity. To determine the level of change in physical activity, a 2X3 mixed model ANOVA was conducted on days of moderate physical activity, days of vigorous physical activity, and total days of physical activity.

A second purpose of the study was to conduct a construct validation of the treatment evaluation. All participants completed a survey at pretest (wk1), posttest (wk8), and follow-up (wk12). The survey measured the constructs of self-regulation, self-efficacy, and social support. In construct validation, one is interested in the impact the intervention(s) had on the
targeted constructs. If the Take Control and/or the Just Move interventions were successful at increasing any of the targeted SCT constructs, then an increase should be seen from pretest to posttest. To examine construct validation of the treatment, a 2X3 mixed model ANOVA was conducted on self-efficacy, social support, and self-regulation.

Thirdly, a process evaluation was conducted. The process evaluation was designed to determine if both interventions were implemented adequately. The process evaluation was measured in four areas: (1) costumer satisfaction survey, (2) length of time to return worksheets/surveys, (3) level of contact with participants and (4) completeness of worksheets or exercise logs. The first area was 'customer satisfaction of intervention'. Subjects were questioned on usefulness of various aspects (such as goal setting, exercise logs, lessons, & brochures) of the Take Control and the Just Move interventions. Length of time to return worksheets/surveys and level of contact with participants was tracked to assess level of delivering. Each week, the researcher tracked the extent of the contact with each participant. The range of contact was scored on a scale of 1 (minimally contact) to 5 (most contact).

Completeness of worksheets or exercise logs was tracked to assess the extent of effort put forth by the participant to complete the worksheets or exercise logs. A limitation of a home-based program is that the researcher cannot directly observe participation. To help compensate for lack of direct observation, the researcher subjectively evaluated each worksheet and exercise log for level of completeness. Each worksheet and log was scored on a scale of 0 (not completed) to 5 (completed as intended).

Significance of the Study

The American Heart Association added physical inactivity to its list of primary risk factors for cardiovascular disease (Pollack, 1992). Despite the support for physical inactivity being a risk factor for cardiovascular disease, current activity rates for adults do not meet the Healthy People Objective (U.S. Department of Health & Human Services [USDHHS], 2000).
The ability to adopt and maintain a regular physical activity program into one’s lifestyle has been and remains an important research area.

Sixteen home-based studies were reviewed that promoted physical activity. No published home-based study measured the SCT constructs of self-regulation or social support. Yet SCT interventions conducted by Hallam & Petosa (1998) and Grim (2003) would indicate self-regulation as a strong predictor of physical activity. Hallam & Petosa (1998) and Grim (2003) both recommend further research be conducted on SCT variables. The American Heart Association has been published as a self-help program that has been shown to be effective at increasing adult physical activity. To date, no study has compared a Social Cognitive Theory-based intervention to an intervention in which educational material was based on the American Heart Association.

Description of the Study

The proposed study uses a quasi-experimental, 6 week pre/posttest design, with 4-week maintenance follow-up. This section was designed to briefly introduce the study. More detailed description of the study is given in Chapter Three. The study was comprised of two groups: Take Control and Just Move. The Take Control (Social Cognitive Theory) subjects received a 6 self-guided worksheets that covered material such as time management, exercise barriers, social support, and preferences of exercise. The Just Move group received two American Heart Association brochures. The purpose of the Just Move group was to serve as a comparison group for the Take Control intervention. Both groups received the same resource packet, feedback on logs, incentive, and weekly phone prompts. Both groups (Take Control and Just Move) were measured at pretest, posttest, and follow-up.
Limitations

The study was limited by the following:

1. The study relies on self-report data, on both physical activity rates and SCT constructs. The dependent variables, moderate and vigorous physical activity, were measured by a seven-day recall (self-report measure). The independent variables of self-regulation, self-efficacy, and social support were measured by self-report.

2. The study relies on volunteers. Therefore, a volunteer bias may exist. Therefore an increased level of readiness and motivation may already be present. The sample consisted of volunteers and therefore may not be representative of the population.

3. Participants may already be active, thus a ceiling effect would be created. A ceiling effect illustrates that since subjects are already active, the level of physical activity may not appear to increase from pretest to posttest. Therefore, the impact of the intervention on physical activity may not be able to be determined.

4. Subjects are not randomly selected from the population. The ability to generalize to other populations is limited.

5. The current study is nested within a larger study therefore other factors outside the current study may be impacting the results. This is known as a history effect.

6. A response bias may have occurred. The researcher had some interaction with the subjects. Therefore the subjects may be giving responses that are perceived as desirable.

7. Since subjects are measured over a series of time, a testing effect may occur.

8. Attrition may be a problem. The study is a 6-week intervention, plus 4 week follow-up longitudinal study. It has been estimated that 25-30% of adults drop out of an adult fitness program within 10-20 weeks (Pollock, 1988).
Definitions

1. **Goal-setting**: Evaluative self-reactions that mobilize efforts toward goal attainment (Bandura, 1986). For this study, goal setting is operationalized as the ability to set and obtain exercise goals.

2. **Physical activity**: Any bodily movement produced by skeletal muscle that results in energy expenditure (Casperan, Powell, & Christensohn, 1985).

3. **Self-efficacy**: People’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances (Bandura, 1986). For this study, self-efficacy is operationalized as confidence in one’s ability to overcome exercise barriers.

4. **Self-monitoring**: Technique in which participants observe and record their own behavior (Noland, 1989). In this study, self-monitoring was operationalize as individuals ability to track physical activity via physical activity logs.

5. **Self-regulation**: Personal regulation of goal-directed behavior or performance (Baranowski, Perry, & Parcel, 1997). For this study, self-regulation is defined in terms of self-monitoring, goal setting, social support, reinforcement, relapse prevention, and environmental cues.

6. **Social support**: The comfort, assistance, and/or information one receives through formal or informal contact with individuals or groups (Wallston et al, 1983). For this study, social support was operationalized as the perceived support from friends and family.

7. **Home-based**: A self-directed program in which participants are not required to attend a structured exercise program at a fitness facility.

8. **Free-Living**: Physical activity that is designed to be conducted in the home or in the neighborhood environment.
CHAPTER 2

REVIEW OF LITERATURE

Introduction

The purpose of this chapter was to present a purposive review of literature of relevant topics of adult physical activity. The first section of chapter discusses population estimates of adult physical activity rates using national data. The second section of the chapter reviews self-report measurements of physical activity. The third section reviews Social Cognitive Theory (descriptive and intervention) studies that measure self-efficacy, goal-setting, barriers, social support, and self-regulation in the adult population. These variables were reviewed as the basis of the constructs to be addressed in the current study. The fourth section is a review of the Social Cognitive Theory. In this section the components of self-regulation and self-efficacy were discussed. The fifth section reviews home-based physical activity studies. The sixth section reviews studies that utilized American Heart Association education material as a comparative intervention.

Searches were conducted using Medline (1988-June 2008) and PsychInfo (1987-June 2008). Searches were delimited to: English language and human subjects. Except for Social Cognitive Theory interventions, in which college students were included, all other searches included only the adult population. Articles available through The Ohio State University library system were utilized. Only studies that could be found either in hard copy or over the e-journal were utilized.
Adult Physical Activity Rates

The purpose of this section is to review population estimates of adult physical activity rates using national surveys. The review will begin by examining Healthy People 2010 objectives (U.S. Department of Health & Human Services [USDHHS], 2000). Healthy People 2010 is a set of health objectives for the nation to achieve over the first decade of the new century (2000-2010). Healthy People 2010 objective are used as standard goals for the nation to achieve. For the purpose of the proposed study, Healthy People 2010 objectives will be set as the standard for which behavioral objectives and impact evaluations will be evaluated.

The following objectives are stated in Healthy People 2010:

22-1 Target: 20 percent Baseline: 40 (from 1997 NHIS)
Reduce the proportion of adults who engage in no leisure-time physical activity.

22-2 Target: 30 percent Baseline: 15 (from 1997 NHIS)
Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day.

22-3 Target 30 percent Baseline: 23 (from 1997 NHIS)
Increase the proportion of adults who engage in vigorous physical activity that promotes the development and maintenance of cardio-respiratory fitness 3 or more days per week for 20 minutes or more.

The source for the Healthy People 2010 Objectives 22-1, 22-2 and 22-3 is based on the 1997 National Health Interview Survey (NHIS). NHIS data is collected through randomization of households in which a home interview is conducted. The questions asked were:
“How often do you do vigorous activities for at least 10 minutes that cause heavy sweating or large increase in breathing or heart rate?” “About how long do you do these vigorous activities each time?”

“How often do you do light or moderate activities at least 10 minutes that cause you only light sweating or slight to moderate increase in breathing or heart rate?” “About how long do you these light or moderate activities each time?”

If respondents answered ‘Never’ or ‘Unable to do activity’, they were classified as inactive. Respondents that answered “28 times a week or over” for the moderate or vigorous question were eliminated.

The Healthy People 2010 physical activity rate section is based on results from the 1997 NHIS survey. According the Health People 2010 (HP 2010), 43% of females and 36% of males report no leisure-time physical activity (40% total). The rates of ‘no leisure time physical activity’ are lowest for the age group of 18-24 (31%) and increase steadily from 34% (25-44 years), to 42% (45-64 years), to 51% (65-74 years) to the highest at 65% for the age group 75 years and older. Rates for moderate physical activity (30 minutes or more, 5 days a week or more) are reported as 13% for females and 16% for males (15% total). The rates for moderate activity do not seem to change substantially across the various age groups. For 18-24 year olds, the rates for moderate activity are 17%; 15% (25-44 years); 14% (45-64 years); 16% (65-74 years); and 12% for (75 years and older). For vigorous activity, 23% of adults report engaging in vigorous activity (20 minutes for 3 days a week). More men (26%) report engaging in vigorous physical activity as compared to women (20%). There appears to be an age-effect for vigorous activity. The highest percentage of vigorous activity (32%) is reported in the youngest age group 18-24 years. The rates of vigorous physical activity fall as age increases [27% (25-44 years); 21% (45-64 years); 13% (65-74 years); and 6% (75 years and older)] [USDHHS, 2000].
The Behavioral Risk Factor Surveillance System (BRFSS) was created to help states obtain prevalence estimates on various health behaviors. The BRFSS conducts monthly, year-round telephone interviews. The BRFSS survey is the largest continuously conducted telephone health survey. Phone numbers are randomly selected through the state. Individuals 18 and older are randomly selected from each household called. The telephone interview lasts about 10-20 minutes. The 2001 BRFSS survey measured activity with the following questions: “Now thinking about the moderate activity you do in a usual week, do you do moderate activity for at least 10 minutes at time (such as brisk walking, bicycling, vacuuming, gardening?)” “Now think about the vigorous activity you do in a usual week, do you do vigorous activity for at least 10 minutes (such as running, aerobics)?”

For each activity, participants were to indicate number of days per week and total time engaged in activity. Current guidelines recommend at least 30 minutes of moderate activity 5 days a week, or at least 20 minutes of vigorous activity 3 times a week. Three mutually exclusive groups were made based on reported physical activity rates. Adults who reported no physical activity were assigned Level 1. Adults who reported activity but at levels less than the recommended amount, were assigned Level 2. Adults who reported recommended amounts of either moderate or vigorous activity were assigned Level 3. Furthermore, the groups were stratified into age groups (18-44, 45-64, and more than 65 years. Table 2.1 illustrates the results from the BRFSS 2001 study (Brown, Balluz, Heath, et al., 2003).

<table>
<thead>
<tr>
<th></th>
<th>18-44 Years</th>
<th>45-64 Years</th>
<th>65 of older</th>
<th>Average across all age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td>17.8%</td>
<td>37.1%</td>
<td>45.2%</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>9%</td>
<td>16.6%</td>
<td>24.7%</td>
<td>9.43%</td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>6.6%</td>
<td>12.2%</td>
<td>17.9%</td>
<td>12.23%</td>
</tr>
</tbody>
</table>

Table 2.1: 2001 BRFSS: Rates of Physical Activity Categorized According to Age Group and Activity Level
The most recent Ohio physical activity figures are from the 2007 BRFSS. In this data set, the questions is “30 minutes or more of physical activity five or more days per week, OR vigorous physical activity for 20 minutes three or more days per week”. The results reveal that 49.7% Ohio residents (48.1% female and 50.5% male) meet the moderate or the vigorous standards. A separate question for vigorous activity “20 minutes of vigorous physical activity three or more days per week” revealed that 27.2% of Ohio adults (23.6% female, 31.2% male) met the vigorous standard.

The Selected Metropolitan/Micropolitan Area Risk Trends (SMART) utilize data from the BRFSS to analyze trends in selected metropolitan areas. Columbus results indicate that 49.1% of Columbus adults met the statement “Adults with 30 minutes or more of moderate physical activity or vigorous physical activity for 20 minutes or more three days per week” and 28.4% met the statement “adults with 20 minutes or more of vigorous physical activity three or more days per week.”

**Measurements of Physical Activity**

The purpose of this section is to describe the use of self-report measurements of physical activity. The section will begin by discussing the advantages and disadvantages of using self-report instrument. This discussion is relevant because the chosen measurement for the proposed study is a self-report instrument.

**Advantages and Disadvantages of Self-Report (Recall) Instruments:**

The purpose to this section is to provide an overview of the advantages and disadvantages of using a self-report as the measure of physical activity. Recall instruments are commonly used in large sample studies. The BRFSS, NHANES, and the NHIS all used a form of self-report. The BRFSS use a telephone to conduct their survey, while the NHANES and NHIS conduct a home interview to collect their data. The advantages of recall instruments include...
are: inexpensive, easy to distribute, and acceptability by subjects, and depth of information. Unlike more objective measurements, such as pedometers and heart rate monitors, recall instruments do not require the participant to wear equipment, stay in a hospital, run on a treadmill, or perform a specific task. Therefore, recall instruments are easily accepted by the participant (Dishman, Washburn, & Schoeller, 2001; Melanson & Freedson, 1996).

An attractive aspect of using self-report is that a variety of variables can be assessed from one source. For example, type of aerobic activity (planned exercise vs. lifestyle), mode of activity (walking, jogging, swimming), intensity, duration, frequency, physical location, and reasons for exercising can be measured. In short, all dimensions of physical activity can be measured (duration, frequency, mode, and intensity) on a daily basis using a recall instrument (Baranowski, 1988).

Two of the major sources of errors in the use of self-report instruments are the definitions of the desired variables and memory recall. The definition of exercise varies among the self-report instruments (Baranowski, 1988). This may be due to the outcome that is desired (weight management, cardiovascular disease, or general health). Depending on how the instrument defines activity, individual responses will vary. Therefore two instruments that both measure physical activity recall, will have varying responses.

The second type of error in the use of self-report instruments is memory recall. If a person does not have the skill necessary to accurately recall the activity, error arises. It has been suggested that people do not store individual events, but rather patterns of behavior. These patterns may be oversimplifications of strings of events and may not be accurate when recalling one particular event, but relatively accurate when it comes to recalling a general pattern. Individuals are bombarded with many events. A person will not be able to remember all the events in a day, only the events that are prominent (Baranowski, 1988). Memory decay is also an issue. Over time memory becomes less accurate. Telescoping is another common problem with self-report. Telescoping is when events that happened before the assessment
period are pushed forward toward the time frame of the assessment. Telescoping usually artificially increases the reported number of events (Baranowski, 1988).

For the purposes of this study, a seven-day recall instrument was chosen (Petosa, 1993). The advantage of the instrument is that it provides detailed information about exercise behavior (days, minutes, mode, and intensity). Another advantage is that it is relatively inexpensive, easy to administer, and has been studied in adults (Petosa, 1993, Hallam & Petosa, 1998) and in college students (Petosa, Suminski, & Hertz, 2003; Grim, 2003). Although as stated above, there are disadvantages associated with self-report (recall) instruments, the enrichment of data obtained from self-report instruments outweigh the disadvantages.

**Social Cognitive Theory (SCT) Studies for Physical Activity**

The purpose of this section was to examine descriptive and intervention studies that examine the variables of the SCT, such as: self-efficacy, self-regulation, social support, barriers, and goal setting. For the purposes of this review 'descriptive studies' will be defined as a study that utilizes a cross-sectional study design; or a study that does not attempt to change behavior through educational or behavior modification techniques. Intervention studies will be defined as studies that alter behavior through educational or behavior modification techniques.

All searches were conducted in PsychInfo 1997-2008. Key words included: self-efficacy, self-regulation, social support, barriers, goal setting; and then physical activity, social cognitive theory, adults, community. These keywords were combined to narrow article selection. Searches were delimited to: human subjects, English, and journal article. The variables of self-efficacy, self-regulation, social support, barriers, and goal setting, were chosen because (1) had been identified in previous research as a determinant of physical activity, (2) were relevant to the study, (3) were modifiable.
Social Cognitive Theory Descriptive Studies

The purpose of this section was to review a select number of determinants of adult physical activity in the descriptive literature. Only studies that measured: self-efficacy, goal-setting, barriers, social support, and self-regulation in an adult population in terms of the SCT were included in the search.

The section begins by reviewing articles that discuss intrapersonal factors (or factors that are within the person). The discussion on intrapersonal factors will start with perceived exercise enjoyment, followed by outcome expectancy value, and self-efficacy as determinants of physical activity. The discussion then turns to external factors (outside the person) and discusses social support and use of exercise equipment in the home as determinants of physical activity. Finally the section examines two studies that utilize more complete models of the SCT, in which intrapersonal and external factors are measured.

Intrapersonal Factors

Salmon, Owen, Crawford, and Bauman (2003) conducted a cross-sectional study. The purpose of the study was to assess the relationship of barriers, enjoyment, and preferences for leisure-time physical activity. Out of 3000 randomly selected participants from the Australian Electoral Commission Roll, a total of 1,332 surveys were returned. Leisure time physical activity was measured by a 1-week self-report assessment in which frequency and duration were obtained for walking activity, moderate activity (for recreation, sport, or health and fitness purposes that did not make you breathe harder or puff and pant), or vigorous (for recreation, sport, or health and fitness purposes that made you breathe harder or puff and pant) activity. Leisure time sedentary behavior was assessed using a 1-week recall of time spent in nine sedentary behaviors such as computer use, television, listening to music, talking on the phone, driving, sitting or lying, socializing, hobbies, reading, or relaxing and resting. No reliability or validity was reported for these instruments. Barriers to physical activity were measured using a 5-point Likert scale ranging from 1(no barriers) to 5 (very much a barrier). Environmental barriers included weather, cost, air or noise pollution, safety, no sidewalks, and
no access to facilities. Personal barriers included other priorities, disability or injury, work commitments, age, feeling tired, family commitments, and lack of time. Enjoyment of physical activity and sedentary behavior using a 5-point Likert scale in which attributes of 12 physical activities and 9 sedentary behaviors were ranked 1 (no enjoyment) to 5 (a lot of enjoyment). Preferences for physical activity or sedentary behavior were measured by using four forced answers in which respondents were to choose a preferred activity. A sample item would be “In the morning before work, which one of the following activities would you prefer to do if you had your choice?” – vigorous activity, moderate activity, inactive recreational pastimes. Preference was measured on a scale of 0 (low preference) or 4 (high preference). The results for physical activity indicate that men reported an average of 3.8 hours per week in moderate activity and 1.7 hours in vigorous activity. Women reported an average of 2.9 hours per week in moderate activity and 1.2 hours in vigorous activity. For sedentary behavior, men spent significantly more time in sedentary behavior as compared to women (p<.01). For both sexes, television watching was the most reported leisure time behavior. Other than weather, environmental factors were not reported as being significantly related to physical activity. Multiple regressions were conducted on moderate physical activity and vigorous physical activity. The regression analysis for moderate activity reported enjoyment for moderate activity as accounting for the most variance (R²=8.4, p<.01), followed by preference for moderate activity (R²=2.9, p<.01). For vigorous activity, the regression analysis revealed that preference for vigorous activity accounted for the most variance (R²=16.3, p<.01), followed by enjoyment of structured activity (R²=3.6, p<.01). In summary, enjoyment accounted for 9% for moderate activity, as compared to 4% for vigorous activity. Preference accounted for 16% of the variance in vigorous, while it only accounted for 3% of the variance in moderate activity. It could be hypothesize that the reason preference accounted for more variance in the vigorous model is that vigorous activity may be perceived as uncomfortable, thus only individuals who like the vigorous intensity would perform vigorous activity. Although enjoyment only account for 4-9% of the variance, it should be noted that those who reported enjoying walking were
three times more likely to report walking for more than 2.5 hr/week. Those who reported
enjoyment of structured physical activity were two times more likely to report recommended
levels of vigorous physical activity (Salmon, Owen, Crawford, & Bauman, 2003).

The discussion now turns to the variable of self-efficacy. Self-efficacy is often
measured in the exercise literature and has been consistently and positively associated with
conducted a review of literature of exercise determinants in adults. All the studies reviewed by
Dishman (n=15), except one, found a positive relationship between self-efficacy and exercise
levels. Desharnais, Bouillon, and Godin (1986) conducted a study whose purpose was to
examine expectations of outcome and self-efficacy and adherence to physical activity. The
study consisted of 98 adults (28 men and 70 women) recruited from a physical fitness
program offered at a university. Expectation of outcome was measured using 16 items that
subjects were to indicate on a 7-point scale to what extent they expected that attending the
program regularly would lead to specific outcomes. Expectation of self-efficacy was
measured by asking subjects to indicate on a 7-point scale the extent they expected to be
capable of attending the program regularly until its completion. Reliability and validity were not
reported for these instruments. Adherence was obtained from attendance records kept by the
fitness leader during the 11-week program. Adherers were defined as “attending at least 1
day per week for a period of 11 weeks” (n=32). Participants who failed to meet both
classification criteria were identified as “drop-outs” (n=66). The results indicate that drop-outs
had a lower self-efficacy mean (4.7, SD=2.2) as compared to adherers (mean=5.9, SD=1.4).
In contrast, drop-outs had a higher outcome expectation mean (28.9, SD=16.7) as compared
to adherers (mean=23.7, SD=13.4). A discriminant analysis revealed that both expectation of
self-efficacy and expectation of outcome made a contribution to group discrimination as
indicated with significant Rao’s V [Self-efficacy Roa V change= 9.11, p<.002; outcome Roa V
change=4.63, p<.032]. This would also indicate that self-efficacy best distinguished between
those who adhere and those who drop-out. Adherers had higher scores of self-efficacy, while
drop-outs had higher scores on outcome expectations. The authors concluded that self-efficacy may be a more central determinant than expectations. Drop-outs were less sure of their capability of attending the program on a regular basis, yet expected more benefits from the program. This indicates that those who were classified as ‘drop-outs’ may have had unrealistic expectations of the benefits of the program. Since drop-outs were associated with lower self-efficacy, but higher outcome expectations, a possible strategy for implementation would be to alter subjects’ outcome expectations at the start of the program. Another strategy could be to start with activities that the subject perceives as highly efficacious and progress to more intense activities (Desharnais, et al, 1986).

Sears and Stanton (2001) conducted a longitudinal study on 86 women who were recruited from a women’s health club. The purpose of the study was to examine effects of expectancy of exercise benefits, values of benefits, and self-efficacy on exercise behavior in sedentary women. Measurements were taken at baseline, 6 weeks, and 12 weeks. Measurements included: Expectancy-value measured by Silberstein et al. (1988) Reasons for Exercise Inventory (REI); self-efficacy was measured by the Marcus, Selby, Niura, and Rossi (1992) instrument; and exercise measured by exercise logs. The instrument, Reasons for Exercise Inventory, has five subscales: fitness/health, appearance/weight management, stress/mood, and socialization. All measurements, except exercise logs, had established reliability and validity. At baseline, the average score for self-efficacy was 2.87 (SD=.077). For days of exercise, the data indicate that the mean was 21.53 (SD=14.80) from week 1-6. The mean for days of exercise for week 7-12, was lower (mean=13.28, SD=13.19) than for week 1-6. The reduction in days of exercise for week 7-12 was not that surprising. According to Dishman, et al., (1985), 50% of all participants drop out of an exercise program within the first 6 month of initiation. A hierarchical multiple regression conducted on the 12-week data revealed that self-efficacy was a significant predictor of exercise (R2=.075, p<.05). The total expectancy-value scale and the subscales of expectancy-value were not significant predictors of exercise. ANOVA’s were conducted on baseline demographics, fitness, and reasons for
exercise, comparing drop-outs (n=21) to completers (n=65). Compared with completers, drop-outs had significantly less education (p<.01), higher expectancies for weight, mood, and total satisfaction (p<.05). The authors concluded that the expectations for weight and fitness were more likely to be violated. This means that subjects had a high expectation of the benefits of exercise related to weight and fitness. The results that people experienced after partaking of the behavior (exercise) did not match their expectation. From the two studies (Sears & Stanton, 2001; Desharnais, Bouillon, and Godin, 1986) that addressed self-efficacy and outcome expectations, the common theme in both studies were that drop-outs (as compared with adherers) were associated with higher outcome expectations at pre-test. Adherers (as compared to dropouts) had higher self-efficacy. It could be logically inferred that if drop-outs have higher outcome expectations at the beginning of a program, interventions should address realistic expectations of the benefits of exercise to participants. Understanding what is to be realistically expected from exercise can alleviate possible frustration of the participants.

**External Factors:**

Social support was defined as the comfort, assistance, and/or information one receives through formal or informal contact with individuals or groups (Wallston et al, 1983). Social support from family and friends has been consistently been positively correlated with physical activity (Dishman, 1994; Sallis & Owen, 1999; Morgan, 1999; Sallis, J., Hovell, M., Hofstetter, C., Faucher, P., et al., 1989). Duncan, Duncan, and McAuley (1993) conducted a study on adult, healthy, and sedentary males (n=41) and females (n=44) who were participating in an exercise program. The purpose of the study was to identify domain-specific combinations of support that could be implicated as important precursors of adherence to prescribed exercise regimen. Most of the subjects were Caucasian (97%) and married (69%). Social support was measured using the Social Provision Scale (Russell & Cutrona, 1987) which was developed to assess the six domains/provisions of social support as identified by
Weiss (1974). The six domains identified by Weiss (1974) are attachment (emotional support); social integration (network support); reassurance of worth (esteem support); reliable alliance (tangible aid); guidance (informational support); opportunity for nurturance (helping others boosts one’s own sense of worth). Each provision was assessed by four items. Respondents were to indicate on a 4-point scale [1=not at all true, 4=completely true] the extent to which each statement described their social relationships. Exercise adherence was measured by exercise leaders, who kept records of each participant’s exercise behavior in terms of intensity, frequency, and duration. Program participants were led in an organized aerobic activity that lasted approximately 40-50 minutes for a period of 10 weeks. At the 10th week, social support was measured. A stepwise discriminant analysis was conducted separately for males and females on the grouping variable (adherer vs. non-adherer) with the social provision scales as the discriminant variables. For men, the analysis revealed a significant Wilks lambda=.856, F(2,39)=3.20, p<.05, with only social integration and guidance entering the equation. Standardized coefficients revealed that social integration contributed most to group differences. Evaluating group means indicate that participants who had a negative score on social integration and guidance were associated with being a non-adherer, and positive scores were associated with being an adherer. For females, the analysis resulted in a significant Wilks lambda=.691, F(2,41)=9.577, p<.001, with only guidance and reassurance of worth entering the equation. Standardized coefficients revealed that both social integration and reassurance of worth entered equally into the equation. Similar to the men, lower scores on the variables were associated with non-adherers and higher scores were associated with adherers. Looking back at the six provisions of social support, the results from this study would indicate that for males, social support in the form of ‘social integration’ (network support) and ‘guidance’ (informational support) would be associated with adherence. For females, social support in the form of ‘reassurance of worth’ (esteem support) and ‘guidance’ (informational support) would be associated with adherence. This study supports social support as a determinant of physical activity. It is important to note that there
appeared to be a gender difference for the type of social support that was significant (Duncan, Duncan, & McAuley, 1993).

The presence of exercise equipment has been studied as a determinant of exercise behavior. Jakicic, Wing, Bultker, & Jeffrey (1997) conducted a study assessing the relationship between presence of exercise equipment in the home and physical activity level. The study was a cross-sectional design. Ninety-eight men and ninety-six women from two universities were chosen as subjects for the study. Physical activity was measured using Paffenbarger Questionnaire. This instrument has established reliability and validity. This questionnaire asks individuals to recall the number of block walked, stairs climbed in the previous week, and to indicate frequency and duration of all sport and recreation activities that were participated in the previous week. Exercise equipment was measured using a list of 14 common types of sport, recreation, and exercise equipment that might be commonly found in a home. Participants were instructed to walk through their house and report presence of equipment. Equipment was categorized according to: team sports (e.g., basketball); individual sports (e.g., golf clubs); recreational (e.g., rollerblades); and home equipment (e.g., treadmill). No reliability and validity were reported for this instrument. The results revealed that almost all participants own a pair of athletic tennis shoes; and over half owned a bicycle, baseball, tennis, and skates. Overall, the participants had on average 5.7 pieces of equipment, with individual recreational having the most per category. There was no significant correlation between home equipment and level of physical activity for the total sample or for men separately. However, for women there was a significant correlation between recreational equipment and total home equipment and total physical activity level.

The section on external factors discussed social support and use of exercise equipment in the home as determinants of physical activity. The discussion now examines studies that utilize a variety of intrapersonal and external factors as determinants of physical activity.
Studies that Examine Intrapersonal and External Factors as Determinants of Physical Activity:

The purpose of this section was to examine studies that measure intrapersonal and external factors together as determinants of physical activity. The first study to be examined was the study by Petosa, Suminski, & Hortz (2003). This is the only study in the descriptive literature that used college student as their population. This article was included because of its relevance to the present study. Petosa, Suminski, and Hortz (2003) conducted a prospective study on 350 college students at a Midwestern university, who were enrolled in a Personal Health introductory course. The purpose of the study was to test SCT constructs in predicting vigorous physical activity among college students. On the second week of class subjects were recruited. Over the next 3 class sessions, students completed a series of instruments measuring SCT variables. After the sessions that measured the SCT variables, over the next four weeks students completed a 7-day recall instrument (Petosa, 1993). The variables measured were self-regulation (Petosa, 1993); outcome expectancy value (Dishman & Steinhardt, 1990); exercise-role identity (Anderson, Anderson, & Cychosz, 1994); positive exercise experience (McAuley & Courneya, 1994); social support (Triebet, Baranowski, Braden, et al., 1991). All instruments had established reliability and validity. Over the course of the 4 weeks, 45% of subjects averaged less than 1 day per week, with an additional 34% averaging less than 3 times per week. A bivariate correlation matrix revealed that all the SCT variables were significantly correlated with vigorous days of physical activity (p<.001). A regression analysis revealed that all SCT variables measured were retained in the model (p<.01) and accounted for 27% of the variance in total days of physical activity. Self-regulation accounted for the most variance (R2 change = .069). The other variables reported an R2 change value ranging from .043-.024. In this study, although all the SCT variables measured were retained in the model, self-regulation by far accounted for the most variance in days of vigorous physical activity.
Sallis, Hovell, Hofstetter, et al. (1989) randomly sampled 4729 adults in the San Diego area. The purpose of the study was to explore the association between several SCT variable and self-reported days of vigorous activity. The design of the study was a pre-test, post-test with a comparison group. No educational or behavior modification intervention appears to have been developed. Physical activity was measured “During a usual week, about how often do you do physical exercise in your free time for at least 20 minutes without stopping, which is hard enough to make your heart rate and breathing increase a large amount?” Twenty-four variables were selected to be measured in this study. Examples include: self-efficacy, modeling, social support, barriers, benefits, knowledge, normative beliefs, home equipment, neighborhood environment, and convenience of facilities, demographic information, and past history. No validity or reliability was reported for the instruments. Self-efficacy was the variable that had the highest correlation with physical activity (r=.48). All the other measured variables ranged in correlations from -.22 - +.28. To account for the large discrepancy between self-efficacy and the other variables, self-efficacy was excluded from the regression equation. A multiple regression analysis was run (excluding self-efficacy) on the entire sample. The significant predictors were: modeling (β=.09, p<.001); friend support (β=.32, p<.001); barriers (β= -.32, p<.001); benefits (β=.17, p<.01); home equipment (β=.12, p<.001); age (β=.02, p<.001); education (β=.05, p<.01); smoking (β=-.02, p<.001); and diet (β=.15, p<.001). Neighborhood environment and convenience of facilities were not significant predictors of physical activity. Barriers and friend support has the largest beta weights in the model (Sallis, et al., 1989). The authors suggest that a ‘would-be’ exerciser be teamed up with an ‘already exerciser’ or spend time with individuals who are active. The authors also suggest addressing barriers. Those who have a high perception of barriers are less likely to adhere to an exercise program.

Sallis, Hovell, Hofstetter, and Barrington (1992) re-evaluated the respondents from the 1989 published article. The purpose of this study was to evaluate the ability of a multivariate model of exercise determinants, based on the SCT, to explain variation in
vigorous physical activity during 24 months in a community sample of adults. The same
survey was administered to the participants 24 months apart. The follow-up sample consisted
of 1719. Over the past 24 months, 25% reported increasing their physical activity, while 16%
reported decreasing their vigorous physical activity. The variable exercise change was
computed using original and 24 month data. The significant predictors of exercise change
was: self-efficacy (Beta=.221, p<.01), barriers (Beta=-.135, p<.01), friend support (Beta=.092,
p<.01), and family support (beta=.079, p<.01). In both studies, self-efficacy was the strongest
predictor of exercise behavior. Barriers to exercise and friend support were retained in both
models.

Sallis, Hovell, and Hofstetter (1992) published a third article based on the same study
(published in 1989 and 1992). The purpose of the study present study was to extend previous
work by examining a more comprehensive set of theoretically based predictors of adoption
and maintenance of vigorous activity. Due to missing data, the sample size is 1661. The
authors classified subjects into three groups based reported vigorous activity. Sedentary was
defined as zero days reported at baseline; intermediate was defined as 1-2 sessions of
vigorous physical activity per week; active was defined as 3 or more sessions of vigorous
activity per week. At follow-up, remaining subjects were classified again, using the definitions.
Of those who were sedentary at baseline, 60% were sedentary at follow-up. The groups
(sedentary, intermediate, and active) were further categorized according to gender
(female/male) and age (18 – 49 years/over 50 years). The results indicate that younger men
and younger women were more likely to adopt an intermediate level at follow-up, then the
older men and women. Older women were most likely to stop exercising at follow-up. A
multiple regression was conducted for each actively level and gender combination (ie.
Sedentary men, sedentary women, intermediate men, intermediate women, etc) using the
same variables in the other two studies (Sallis, et al. 1989; Sallis et al., 1992). For baseline
sedentary men, the significant predictors of follow-up physical activity were: self-efficacy
(β=.247, p<.001); age (β=-.025, p<.01); and neighborhood environment (β=-.123, p<.05). For
baseline sedentary women the significant predictors of follow-up vigorous activity were: education ($\beta=.44$, $p<.05$); self-efficacy ($\beta=.14$, $p<.05$); friend support ($\beta=.70$, $p<.05$); and family support ($\beta=.61$, $p<.05$). Baseline intermediate men significant predictors of smoking ($\beta=-.07$, $p<.05$); and modeling ($\beta=.21$, $p<.05$). Baseline intermediate women significant predictor was body mass index ($\beta=-.14$, $p<.05$). Baseline active men significant predictors of follow-up vigorous activity are: self-efficacy ($\beta=.25$, $p<.0001$) and age ($\beta=-.03$, $p<.05$). Baseline active women, significant predictor was education ($\beta=.43$, $p<.01$). The authors conclude that this study suggests that there is a gender difference for adoption and maintenance of physical activity. Self-efficacy was a significant predictor for sedentary men and women. This would suggest that self-efficacy is an important variable for the adoption of physical activity. Education was a significant predictor of both sedentary women and active women. This would suggest that education is a significant predictor for adoption and maintenance in women (Sallis, Hovell, & Hofstetter, 1992).

**Summary & Analysis of Descriptive Studies:**

Social support has been supported in the descriptive literature as a predictor of physical activity (Sears & Stanton, 2001; Petosa, Suminski, & Hortz, 2003; Sallis et al., 1989; Sallis, Hovell, Hofstetter, & Barrington, 1992). However there appears to be some gender differences. In the study by Sears and Stanton (2003), social support in the form of social networks and informational support were significant for men. However, for women, social support in the form of esteem support and information support were significant. Note in both genders, informational support was a significant predictor. It could be suggested that persons who are newly adopting an exercise regimen need knowledge and social support. Sallis et al. (1989) suggest that ‘would-be’ exercisers be teamed up with ‘already exercisers’ or spend time with individuals who are active. The ‘already exercisers’ would be able to provide not only a “buddy-system” but also be able to answers questions or provide suggestions on technique or strategies.
Throughout the descriptive literature examined for this project, self-efficacy was consistently a significant predictor of physical activity (Desharnis, et al., 1986; Sears & Stanton, 2001; Petosa, Suminski, & Hortz, 2003; Sallis et al., 1989; Sallis, Hovell, Hofstetter, & Barrington, 1992; Sallis, Hovell, & Hofstetter, 1992). In three of the studies, self-efficacy was the variable with the highest correlation (Sears & Stanton, 2001; Sallis et al., 1989; Sallis, Hovell, Hofstetter, & Barrington, 1992). Three studies measured some form of outcome expectation (Sears & Stanton, 2001; Desharnis, et al., 1986; Petosa, Suminski, & Hortz, 2003). The study conducted by Petosa, Suminski, & Hortz (2003) indicate that although outcome expectancy value is significantly correlated with vigorous days and is retained in the regression model, it does not have the highest correlation value nor does it account for the most variance. Sears & Stanton (2001) and Desharnis et al. (1986) have compared self-efficacy and outcome expectancies for individuals who adhered to the exercise program and those individuals who have dropped out. In both studies, ‘adherers’ had higher levels of self-efficacy, but lower levels of outcome expectations of the benefits of exercise. ‘Drop-outs’ had lower levels of self-efficacy, but higher levels of outcome expectations as related to the benefits of exercise.

Social Cognitive Theory Interventions:

The purpose of this section is to examine studies that implemented an intervention based of SCT in the adult population. For the purposes of this review, an intervention study was defined as a program or intervention that implements an ‘in-class’ educational or a behavioral modification technique whose purpose is to alter intrapersonal or social factors to improve physical activity adherence. Studies that implemented an exercise-regimen-only technique were excluded. Only three studies could be found that met the criteria stated above.

Calfas, Sallis, Nichols, Sarkin, et al. (2000) conducted a study called the Project Graduate Ready for Activity Daily (Project GRAD) program. Participants were 185 male and
153 female seniors from a large urban university who responded to an invitation to participate in a health course to receive credit. Eligible participants had to be aged 18-29, have senior standing, and intend to graduate in the next 2 semesters. Following baseline assessments, students were randomly assigned to receive the intervention course (treatment) or a control course (comparison) that covered general health topics. The intervention was based on concepts from the Transtheoretical Model and Social Cognitive Theory. Instruments distributed included: stage of change (Marcus, Rakowski, & Rossi, 1992); self-efficacy (Sallis, Pinski, Grossman, Patterson, & Nader, 1998); social support (Sallis, Grossman, Pinski, Patterson, & Nader, 1987); benefits and barriers (Sallis, Hovell, Hofstetter, et al., 1989); enjoyment (Kendzierski & DeCarlo, 1991). Physical activity was measured using the seven-day recall PAR (Blair, 1984). The intervention students attended 15 weekly 50 minutes lectures. They also had a 110 minute weekly lab experience in which they were to apply the lecture material. Each lab included supervised physical activity and personal application of a behavioral strategy. Students also wrote term papers in which they were to anticipate barriers to being physically active three years after graduation and developed plans to address these barriers. The 18-month post-graduation intervention was designed to assist participants as they made the transition from college to other life roles. Participants received monthly mailed materials with follow-up phone calls from counselors that reflected the content of the mailed material. The control group attended 2 hours of weekly lectures for 15 weeks. During the 18-month follow-up, participants in the control group received the bimonthly Berkeley Wellness Newsletter. A three way ANOVA [2 (intervention/control) X 2 (active/inactive at baseline) X 3 (baseline, 1 year, 2 year)] was conducted. There was no significant three-way interaction effect. However, post hoc analysis revealed that women in the intervention group increased their use of behavioral and cognitive processes of change compared with control participants over the course of the 2 year period [ F(3,142)=7.92, p<.001]. For men, no variable was significant between the intervention and the control groups at the 2 year period. For the variable physical activity, only strength training for women was significant between the groups.
at the 2 year period. The authors conclude that the intervention was not successful in promoting long-term adherence.

Grim (2003) conducted a study among college students. The purpose of the study was to complete a construct validation of a web-based physical activity intervention for college students. Students self-selected themselves by enrolling in the desired course (web-based, traditional, or health course). The intervention consisted of 10 weeks. Table 2.2 illustrates the weekly lesson plans for the intervention.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lesson</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Survey, fitness assessment, &amp; exercise opportunities</td>
</tr>
<tr>
<td>Week 2</td>
<td>Self-monitoring, taking heart rate</td>
</tr>
<tr>
<td>Week 3</td>
<td>Goal setting</td>
</tr>
<tr>
<td>Week 4</td>
<td>Tailoring</td>
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<tr>
<td>Week 5</td>
<td>Tailoring</td>
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<tr>
<td>Week 6</td>
<td>Midterm</td>
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<tr>
<td>Week 7</td>
<td>Self-efficacy</td>
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<tr>
<td>Week 8</td>
<td>Social Support</td>
</tr>
<tr>
<td>Week 9</td>
<td>Reinforcements and Reasons to Exercise</td>
</tr>
<tr>
<td>Week 10</td>
<td>Course Evaluation, Survey, Final Exam</td>
</tr>
</tbody>
</table>

Table 2.2: Lesson Plans from Grim (2003) Study

Subjects were measured at pretest (week 1 of course); posttest (week 10 of course); follow-up (5 weeks after follow-up). Variables measured for the study were: Self-Efficacy (Garica & King, 19991); Social Support (Trieber et al., 1991); Self-Regulation (Petosa, 1993); Outcome Expectations and Expectancies (Winters, 2001); and 7-day recall (Petosa, 1993).
All instruments had established reliability and validity. Examining groups at follow-up, the 18.8% of the online group reported zero days of moderate activity; 13.6% of the traditional group reported zero moderate days; and 22.7% of the health class group reported zero days of moderate physical activity. The percentage of subjects reported zero days of vigorous physical activity is even higher. Fifty-four percent of subjects in the online group reported zero days of vigorous physical activity; 40.9% of traditional group subjects and 44.0% of health group subjects reported zero days of vigorous physical activity at follow-up. To test whether if difference in constructs between the group at the three time periods, a mixed between-within subjects ANOVA was utilized. A Bonferroni correction was implemented; resulting in an alpha level of .0071. For the variable self-regulation, there was significant effect for time (p<.001). The significant difference was found between post-test and follow-up (p<.001) and between pretest and posttest (p<.001). A One-Way between-group ANOVA revealed that there was a difference at posttest between group (p<.001). Examining means for self-regulation for each of three treatment groups, a clear pattern arises. In each group, self-regulation scores increased from pre-test to post-test, but fell during follow-up (Grim 2003).

For the variable family social support a significant effect for time (p<.05), but no group effect was found. For the online group, means for social support increased from pre-test to post-test but fell during follow-up. The means for the traditional exercise group fell continuously from pretest to post-test, to follow-up. For the health group, family social support means increased slightly from pre-test to post-test, but level off at follow-up. At follow-up all three groups reported similar family social support means. A possible explanation is that all treatment groups consisted of college students, who are probably removed from their family and may have little interaction (Grim, 2003).

For the variable friend social support a non-significant time effect was revealed (p>.0071). The between groups test revealed a non-significant effect for group (p>.05). The means for the friend social support for the traditional group fell through out the study, however the means for the traditional group were higher at all time periods than the online group.
the health group, friend social support rose from pre-test to post-test and continued to rise at
follow-up. At follow-up, the traditional and the health group had reported higher means than
the online group. A possible explanation for this could be that students in the traditional and
health group have social interaction with other students throughout the quarter and thus may
develop new and/or stronger bonds with other students in the class. The online group had
little structured interaction throughout the quarter. Therefore, unless subjects were friends
prior to the study, friendships were probably not being developed throughout the course of
study (Grim, 2003).

For the variable self-efficacy, there was no significant effect for time (p>.0071) and
no significant group effect (p>0071). The means for the traditional group is higher than the
online group at every time period. The means for self-efficacy for the health group dropped
slightly from pre-test to post-test and then fell more drastically at follow-up (Grim, 2003).

For the variable outcome expectancy value, there was a significant effect for time
(p<.001). A significant difference was found between pre-test and post-test and post-test and
follow-up (p<.001). There was no significant difference found between groups (p>.05). For the
online group, the means increased from pre-test to post-test and fell at follow-up to levels that
were below that of the pre-test. The means for the traditional group dropped from pre-test to
post-test, and continued to fall through follow-up. The health group means increased from
pre-test to post-test and fell at follow-up and fell to scores that were below that of pre-test
(Grim, 2003).

For days of moderate physical activity, there was not a time effect or group effect.
For days of vigorous physical activity, there was a significant time effect (p>.01). The
difference occurred at pre-test and post-test (p=.001). There was no significant group effect
for days of vigorous physical activity.

Overall, the intervention had the greatest impact on self-regulation. The average
change for self-regulation for the online group was 52.88, compared to the traditional group
(31.40) and the health group (18.12). Self-regulation is the only variable that is retained in any
of the regression models. This could be due to the fact that students were required to write weekly goals and were also required to self-monitor on a daily basis. Both of these activities relate to self-regulation. For the variables of family and friend social support, it was revealed there was no group effect for either variable. It would appear that the intervention did not significantly impact the variable of social support. Only 1 lesson was used to address social support, therefore it could be possible that the issue of social support was not adequately covered. There was no group or time effect found for the variable of self-efficacy, yet according to the author there were about 4 lessons were devoted to this topic. Lessons that were address self-efficacy included: overcoming barriers, tailoring, exercise preference, new activity, and enjoyment. It could be that the lessons did not address the issue of self-efficacy as intended. Another interesting finding was the scores of self-efficacy in the online group fell below that of pretest at follow-up. This pattern, however, is consistent with findings from other studies (Hallam & Petosa, 1998). It may be that individuals have a perceived idea of their self-efficacy, but when faced with the barrier, their level of self-efficacy drops. For the variable of outcome expectations and expectancies, there was no group effect, indicating no differences between the three groups. The intervention did not appear to have an impact on this variable. When analyzing time spend on the subject, only one lesson was used to address this variable. More time may have been needed to address this issue. For levels of physical activity there was no group effect found for moderate or vigorous physical activity. However, the online group had a lower percentage of participants reported zero days of moderate and vigorous physical activity. However, at follow-up, 23% of the online group, 40% of the traditional group, and 16% of the health group reported three or more days of vigorous physical activity. The intervention may not have been successful getting individual to meet vigorous physical activity requirements, but it was not sustained at follow-up.

Hallam & Petosa (1998) conducted a study at worksite using SCT variables. The purpose of the study was to examine the impact of a four-session worksite intervention on selected SCT variables linked to adult exercise adherence. A non-equivalent pretest-posttest
comparison-group design was implemented. Due to company policy, random selection or assignment was not possible. Employees were enrolled in a first come-first serve basis to the treatment group. Forty-eight subjects met the criteria for inclusion for the treatment group. The comparison group by randomly selecting employees who joined the company’s fitness center within 1 month of the intervention. Thirty-eight subjects met the inclusion criteria for the comparison group. Variables measured were: self-regulation (Petosa, 1993); exercise self-efficacy (Garcia & King, 1991); and outcome expectancy value (Dishman & Steinhardt, 1990). All instruments had established reliability and validity. The treatment group attended four 1-hour sessions. Subjects did not exercise during the sessions. The first session included: an overview of the four lessons; ice breaker; frequency, intensity, and duration one should exercise at; and goal setting. The second session included: expected outcomes; time management; revision of goals; and behavioral contracts. The third session included: soliciting social support; reinforcing exercise behavior, preventing relapse, and revision of goals. The fourth session included: warm-up/stretching/cool down techniques; and proper equipment. An analysis of variance was used to analyze differences in mean change score for each of the SCT variable measured. Self-regulation techniques ad outcome expectations were all significantly between the groups (p<.0001). For the treatment group, self-monitoring increased by 16%; goal setting by 21%, social support by 10%, reinforcements by 13%, time management by 15%, and relapse prevention by 13%. Outcome expectation increased by 8% in the treatment group. Only the variables outcome expectancies and self-efficacy were not significant between the groups. The author suggested that the possible reasons for self-efficacy not being significantly different between the groups could be that the treatment group did not adequately cover the variable. Once subjects began to exercise, subjects would encounter barriers, thus their preconceived perceptions of barriers would be altered (Hallam & Petosa, 1998).

Hallam & Petosa (2004) published another article based on the same study as the Hallam & Petosa (1998) study. The purpose of the study was to test the ability of a four-
session work-site exercise intervention to produce increases in selected SCT variables linked to adult exercise adherence. In this article the authors first conducted repeated measures ANOVA and then conducted regression models to test mediation effects. For the purposes of this section, only the repeated measure ANOVA results will be discussed. The regression equations to test mediation were discussed in the mediation section. Four separated repeated measures ANOVAs were used to measure the effect of the intervention on the SCT variables and exercise behavior. All analysis were set at p<.05. The repeated measures ANOVA for the variable self-regulation revealed a significant group by time interaction [F(3,64) = 98.74, p=.001]. Differences were found between the groups at pretest, 6 weeks, 6 months, and 12 months (p=.001). For the treatment group, scores on self-regulation were higher at 6 weeks (119.70 ± 3.6), 6 month (120.53 ± 4.4), and 12 month (121.13 ± 4.9) than the pretest (97.20 ± 4.2)(p=.001). For the comparison group, the opposite relationship was found. Self-regulation scores at pre-test were significantly (p=.001) higher (109.68 ± 5.0), than scores at 6 week (105.04 ± 4.4), 6 month (103.64 ± 5.3), and 12 month (100.82 ± 5.8). A repeated measures ANOVA for the outcome expectancy value revealed a significant group by time interaction [F (3,64) = 45.52, p=.001]. Similar to self-regulation, the treatment group scores for outcome expectancy value at pretest were significantly (p=.001) lower at pretest (111.50 ± 6.1), than scores at 6 week (130.35 ± 6.9); 6 month (125.50 ± 7.2), and 12 months (127.98 ± 7.4). This pattern reveals that for the treatment group, scores for outcome expectancy value, increase between the pretest and 6 weeks, then drop at 6 months, and slightly increase at 12 months. For the comparison group, the opposite relationship is true. The scores for outcome expectancy value are highest at pretest and continue to fall throughout the 12 month period. A repeated measures ANOVA for self-efficacy reveals a significant group by time interaction [F(3,64)=4.07, p=.008]. For the treatment group the self-efficacy pretest score (60.10 ± 2.9) was lower, than the 6 week (62.83 ± 2.7), 6 month (63.90 + 3.0), and 12 month (65.13 + 3.1) observation (p=.001). For the comparison group the scores on self-efficacy for pretest are 60.1 ± 3.5. The score increases at 6 week, decrease at 6 month, and decrease further (lower
than the pretest score) at the 12 month observation. The repeated measure ANOVA for total
days of exercise reveal a significant group by time interaction [F (3,64)=27.07, p<.001). There
is no difference between the groups at pretest, 6 weeks, 6 months, but there was a significant
difference at 12 months (p=.04). The treatment group consistently exercised more days a
week at 6 week, 6 month, and 12 month than the comparison group (p<.001). At pre-test 50%
reported exercising at least 3 days per week, while at 12 month 67% reported exercising at
least 3 days per week.

This study illustrates how SCT variables were maintained over the course of 12
months. For the treatment group, self-regulation scores were increased and then maintained
over the course of 12 months. However, for the comparison group, self-regulation scores
were higher than the treatment group at pretest but fell steadily over the course of the 12
month period. This could be due to the focus the intervention had on goal setting, which is a
factor of self-regulation. Goal setting was reviewed every class session. For the variable of
outcome expectancy value, scores for the comparison group were higher than the treatment
group. However, similar to the pattern seen with self regulation, the comparison group scores
fall steadily over the course of the 12 month period. For the treatment group, the scores for
outcome expectancy value rise sharply at 6 weeks, but then tail off at 6 month, and then
increase again at month 12.

Summary of SCT Interventions:

The main constructs discussed in the literature are: self-efficacy, outcome
expectations and expectancies, goal setting, and self-regulation. In the studies conducted by
Hallam & Petosa (1998) and Hallam & Petosa (2004), the common theme is that self-
regulation was a strong predictor of days of vigorous activity. At pretest (Hallam & Petosa,
2004) the scores for the treatment group were lower than the comparison group, but this
difference was not significant. However, the data indicate that self-regulation scores for the
treatment group increased significantly by week 6 and maintained the level until the 12 month
measure. For the comparison group, scores declined significantly by week 6 and continued to

Analyzing data from Hallam & Petosa (1998), the authors state that in the treatment group,
between pretest and the 6-week posttest, self-monitoring increased by 16%, goal setting
increased by 21%, social support increased by 10%, reinforcements by 13%, time
management by 15%, and relapse prevention by 13%. All of these variables are factors
(subscales) of self-regulation. By impacting the variable of self-monitoring, goal-setting, etc.,
you would impact self-regulation as a whole as seen in Hallam & Petosa (2004). This would
indicate that not only is self-regulation a strong predictor, but the effects appear to last over an
extended period of time.

For the variable self-efficacy, there was a significant group by time interaction. But
analyzing the data more closely revealed no difference between the groups at pre-test, 6
week, 6 month, or 12 month. The difference was within the groups. For the treatment group,
the difference was between the pretest and week 6, 6 months, and 12 months. There was
also a difference between week 6 and 12 months scores, and between 6 month and 12 month
scores. For the comparison group, the within group difference was found between the 6 week
and 12 month measure, and between 6 month and 12 month measure. According to Hallam &
Petosa (1998) the treatment did not result in a significant mean change between pretest and
6 week posttest. These results suggest that the program was not successful at changing self-
efficacy. DuCharme and Brawley (1995), suggests that self-efficacy is a predictor for
adoption of physical activity, but not maintenance. Perhaps the longitudinal nature of the
study (Hallam & Petosa, 1998) prevented self-efficacy as a predictor of adoption from being
captured. Perhaps if self-efficacy was measured closer to the beginning of a program, you
would significance.

The variable of outcome expectations and expectancies does not appear to be a
strong predictor of physical activity (Hallam & Petosa, 1998). In the Hallam & Petosa (1998)
study, outcome expectations were significant, but outcome expectancies were not. In the
study conducted by Hallam & Petosa (2004) for the treatment group, outcome expectancy value was significantly lower at pre-test, than at 6 week, 6 month, or 12 months. For the comparison group, outcome expectancy value pre-test is significantly higher at pre-test, than at 6 week, 6 month, and 12 month measures. The only difference between the groups is at pre-test, with the comparison group scores significantly higher than the treatment group. This pattern would indicate that impact of the intervention does not last over an extended period of time.

It is interesting to note that a common theme in the Hallam & Petosa (1998) study is that the pretest scores for the treatment group for all SCT variables (self-regulation, self-efficacy, and outcome expectancy value) were lower than the scores for the comparison group. Though only the significant difference between the groups (at pretest) was found in outcome expectancy value. A similar pattern can be seen with Sears & Stanton (2001) and Desharnis et al. (1986). In their studies, ‘adherers’ had lower levels of outcome expectations; and ‘drop-outs’ had higher levels of outcome expectations as related to the benefits of exercise. It could be hypothesized that individual’s who have high levels of expectations of the outcomes that will result from exercise, may become frustrated with the results that are actually achieved, once they begin exercise. Because their expectations are not being met, they become frustrated and drop out of an exercise program. In the studies by Sears & Stanton (2001) and Desharnis et al. (1986), the adherers had higher levels of self-efficacy than drop-outs. In the Hallam & Petosa studies (1998, 2004) the treatment had lower levels of self-efficacy than the comparison group (although not significant). It should be noted that in the Hallam & Petosa studies (1998, 2004) no difference was found for self-efficacy between the groups at any time frame. However, Deshamais, Bouillon, and Godin (1986) measured self-efficacy as extent the participants expected to be capable of attending the program regularly until its completion. Sears and Stanton (2001) measured self-efficacy by Marcus, Rossi, Selby, (1992) instrument-which measures confidence to overcome barriers. Hallam & Petosa (1998, 2004) measured self-efficacy by Garcia & King (1991)- which measures

Comparing the studies of Grim (2003), Hallam & Petosa (1998), and Hallam & Petosa (2004) there appears to be differences. It may be important to note that although the population are different (Grim (2003) the used college students and Hallam & Petosa (1998, 2004) used an adult worksite) the instruments utilized in both studies were identical for self-efficacy and outcome expectancy value. The self-regulation instrument used in both studies was similar as well. Hallam & Petosa (1998, 2004) eliminated 5 environmental aid items, while Grim’s (2003) study uses the 5 environmental aids. The pretest, posttest, and follow-up time frames differ as well. Grim (2003) utilizes a 10-week period between pre-test and post-test, with a 5 week follow-up. The time frame for Hallam & Petosa (1998, 2004) is a 6 week, pretest –posttest, 6 month follow-up, and a 12-month follow-up. The method of delivery was different as well. The study by Hallam & Petosa (1998) was conducted in a classroom setting, with participants meeting for four 1-hour meetings. Grim (2003) conducted a web-based study, in which all lessons were utilized via the internet.

For the variable self-regulation, the patterns between Grim (2003) and Hallam & Petosa (1998, 2004) are different. In the Hallam & Petosa (1998, 2004) study, for the treatment group, self-regulation increases significantly from pre-test to 6 week post-test and then remains elevated through the 12 month follow-up. In the Grim (2003) study, self-regulation increases from pr-test to posttest, but falls at the follow-up period. For the Hallam & Petosa (1998, 2004) study, the treatment group means for self-regulation were significantly higher than the comparison group at 6 week, 6 month, and 12 month time frames. In the Grim (2003) the treatment group means appear to be significantly higher than the health groups only at post-test. In the Hallam & Petosa study (2004), for the comparison group, the self-regulation scores continue to fall throughout the study. In the Grim (2003) study, the
comparison groups show a similar pattern of increasing the means at post-test, but then falling at follow-up. A possible explanation for the difference is that in the Grim (2003) study, the ‘traditional’ comparison group received some type of intervention. The tradition group consisted of a standardized activity class. As part of the curriculum, students are taught a small amount of self-regulatory skills such as goal-setting and time management. However, in the ‘health’ comparison group, no self-regulatory skills are taught. In the Hallam & Petosa (2004) study the effects of self-regulation were maintained, but in the Grim (2003) the effects of self-regulation do not appear to be as lasting. A possible explanation could be that a classroom setting builds lasting self-regulatory skills versus a web-based setting. Another possible explanation is that adults are able to maintain self-regulatory skills better than the college population.

For the variable outcome expectancy value, the pattern between the two studies appears to be different. In the Hallam & Petosa (2004) study, for the treatment group, outcome expectancy value scores rise from pre-test to post-test, but then tail off at 6 month and 12 month follow-up. The 12 month follow-up means are still above pretest scores. However, in the study by Grim (2003), means for the treatment group for outcome expectancy value rise from pre-test to post-test, but fall substantially at post-test. The treatment mean for follow-up (mean=541.59) is less than that of pre-test (mean=670.85). The same pattern can be seen for the ‘traditional’ group and ‘health’ group, with the follow-up means being below the means at pretest (Grim, 2003). A possible explanation for the drop in the Grim (2003) study is that participants in the treatment group began an exercise program and had certain assumed expectations of exercise. However, once the treatment group began to exercise, the expectations were not met and therefore participants acknowledged their unrealistic high expectations.

For the variable, self-efficacy a more consistent pattern between the studies is seen with the comparison groups. The pattern for the treatment groups is different. In the Hallam & Petosa (2004) study, for the treatment group, self-efficacy rises slightly (but not significantly)
from pretest to 6 week posttest and continues to rise slightly from week 6 to month 12. In the Grim (2003) study, self-efficacy means increase from pretest to posttest, but then fall at follow-up. The follow-up mean (875.7) is below that of the pretest mean (920.52). A possible explanation for the decline in self-efficacy is that once individuals begin to exercise, they begin to experience barriers and the difficulty of overcoming those barriers. Over an extended period of time, means for self-efficacy decline. For the comparison groups, the means for self-efficacy appear to be more stable across time. In the Hallam & Petosa (2004) study, the mean for self-efficacy rises (non-significantly) from pretest to 6 week posttest and remains stable from week 6 to 6 months, but then drops at the 12 month period. In the Grim (2003) study, the ‘traditional’ comparison group’s mean for self-efficacy rises from pretest to posttest and then drops slightly at follow-up. For the ‘health’ comparison group, the means for self-efficacy fall slightly from pretest to posttest and continue to gradually fall to follow-up. A repeated ANOVA revealed no time effect, so the difference between pretest, posttest, and follow-up is not significant. A possible explanation, for both studies, is that self-efficacy was not properly addressed. The lessons related to self-efficacy are either not long enough in duration or are not covering the variable adequately. More studies need to be conducted to determine the reason as to why self-efficacy is not being a strong predictor.

Overall, self-regulation was the strongest predictor in the studies (Hallam & Petosa, 1998; Hallam & Petosa, 2004; and Grim 2003). Both interventions (Hallam & Petosa, 1998 and 2004; and Grim, 2003) address issues such as, goal-setting and time management. Both of these variables are factors related to self-regulation. Impacting the factors of goal setting and time management would impact self-regulation as a whole. Self-efficacy is consistently reported in the literature as a significant predictor of physical activity. Yet in the studies conducted by Hallam & Petosa (1998, 2004) and Grim (2003), self-efficacy was not a strong predictor of physical activity. As stated early a possible reason for self-efficacy not being a predictor could be the way the variable is addressed in the intervention. Another explanation could be that there is a relationship between self-regulation and self-efficacy, and when self-
regulation is entered into the model, self-efficacy loses some of its predictability. To the knowledge of the author, no study has attempted to explain the relationship between self-efficacy and self-regulation. More research needs to be conducted in this area to assess the relationship between self-regulation and self-efficacy.

Social Cognitive Theory

The purpose of this section was to conduct a review the SCT constructs of self-regulation and self-efficacy. There are several concepts that could be included under the heading of SCT. For the purposes of this study only the variables of self-regulation and self-efficacy were chosen for this study based on strength of relationship between the variable and exercise adherence.

According to Glanz, Lewis, & Rimer (1997) the Social Cognitive Theory (SCT) is classified as an interpersonal theory. In 1986, Albert Bandura published the book “Social Foundations of Thought and Action: A Social Cognitive Theory”. This book is the bases for the Social Cognitive Theory (SCT). The premise of the SCT is the concept of triadic reciprocal of determinism between the person, the environment, and the behavior. The term reciprocal refers to the mutual action between the three causal relationships (Bandura, 1986)(See Figure 2.1)
Self-Regulation: The purpose of this section is to review the components of self-regulation. Self-Regulation is defined as: personal regulation of goal-directed behavior or performance (Baranowski, Perry, & Parcel, 1997). According to Bandura (1991) self-regulation operates through a set of psychological subsets that must be developed in order to move towards self-directed change. The three sub-functions of self-regulation are: self-observation, judgment process, and self-reaction.

Self-Observation (self-monitoring):

Self-observation is the observing or monitoring of one’s own behavior. Noland (1989) defines self-monitoring as techniques in which participants observe and record their own behavior. Self-observation provides two important functions: information needed to set realistic goals; and evaluation of progress towards these goals.

Self-observation is a function of: self-diagnosis and self-motivation. Self-observation provides a “self-diagnostic function” (Bandura, 1991) or more commonly called self-knowledge. This function is not just observing the behavior, but the situation and emotions.
that influence a particular behavior. The self-diagnostic function enables people to notice patterns of behavior (Bandura, 1991). Self-knowledge of patterns of behavior and influences of behavior provide direction for self-regulation.

Self-motivation is influenced by goal setting and self-monitoring orientation (Bandura, 1991). Bandura discusses that when people observe their behavior, they will inherently set goals for themselves (Bandura, 1991). Adopting a goal, regardless of level, without knowing how one is doing, has no lasting motivational impact. The combination of goals with performance feedback heightens motivation (Bandura, 1991). In order to achieve a goal, one must self-regulate the behavior to obtain the goal. The decision-making process of self-regulation could be construed as self-motivation. Observing behavior, setting goals for behavior, and self-reacting to the progress towards goals, provides self-motivation (Bandura, 1991).

**Judgment Process:**

Actions produce self-reactions through a judgmental function. Personal standards for judging and guiding one’s action play a critical role in self-regulation. Personal standards are developed from information through three principal modes of influence: social referential comparisons, valuation of activities, and perceived performance determinants (Bandura, 1991). *Social referential comparison* is comparing one performance to the performance of others. People will tend to compare themselves to individuals in similar situations. *Valuation of activity* is the value one places on a particular activity. People do not care how they perform on activities that have little value to them (Bandura, 1991). *Perceived performance determinant* is the extent to which people contribute successes to their own abilities and efforts. People are more self-satisfied with success that they perceive as being from their own abilities, than with successes achieved by external assistance (Bandura, 1991).
**Self-Reactive Influences:**

Self-reactions provide the mechanisms by which standards or goals regulate a course of action. People pursue a course of action that will produce a positive self-reaction. Incentives can play a role in self-reaction. Incentives can be a tangible reward (i.e. new CD) or internal self-satisfaction. People who set a reward system for goal attainment, generally accomplish more than those who set goals, but do not install a reward system (Bandura, 1991).

**Self-Efficacy:**

The purpose of this section is to review the components of self-efficacy. Self-efficacy is defined by Bandura (1986) as people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances.

Bandura (1977) identified four sources that influence self-efficacy: past performance accomplishments, vicarious experiences, exposure to verbal persuasion efforts, and emotional arousal related to task performance. Of the four influences, past performance accomplishments may weigh the heaviest on self-efficacy (Bandura, 1977). Past performance is based on mastery of a behavior. Successful mastery raises one’s self-efficacy; repeated failures lower one’s self-efficacy. Once mastery of a particular behavior has been established, then one begins to generalize self-efficacy to other behaviors that may or may not be similar to the mastered behavior. Vicarious experience is learning about behavior by watching others perform the behavior. Vicarious experience relies on social comparison, thus it is less dependable of a source for determining capabilities than past experiences are. The strength of self-efficacy obtained through vicarious experience is more likely to be weak and thus the person is more vulnerable to barriers and difficulties. Verbal persuasion is the encouragement of one’s ability from another person. People are verbally persuaded to believe in their abilities to accomplish a task. Emotional arousal is reliance on the psychological arousal that a behavior elicits. High arousal usually debilitates behavior. Individuals who perceive an activity
as stressful, are less likely to perceive themselves of highly capable of performing the behavior.

Self-efficacy has three dimensions; magnitude, generality, and strength. *Magnitude* is level of difficulty. The simpler the task, the more likely that the efficacy of completing the task will be greater. For example, one’s efficacy to walk for 20 minutes is most likely higher than one’s efficacy to run vigorously for 20 minutes. *Generality* is how specific or general one’s efficacy is. Some individuals generate task specific self-efficacy; other generate self-efficacy that extends beyond a specific task. *Strength* is how strong one’s self-efficacy is. Weak expectations are easily dissolved through barriers or difficulty; whereas, strong efficacy is more likely to preserve through barriers and difficulty (Bandura, 1977).

**Summary of Social Cognitive Theory:**

There is a reciprocal relationship between self-regulation, self-efficacy, and goal setting. Goal setting and self-monitoring go hand in hand. Those who monitor their progress, set more realistic goals and have the tools to evaluate goal progression. Goal setting and incentives play a role in self-reactive influences if one sets meeting a goal as a standard for getting an incentive; then the goal would impact self-reactiveness.

Those who are more efficacious may be more successful at self-regulation, than those who are least efficacious. Perceived self-efficacy influences performance through goal setting. Those with higher self-efficacy are more likely to set higher goals and to persevere through difficult times, than individuals with lower self-efficacy (Bandura, 1991). Studies have tested the mediation effects of SCT variables. As discussed in the previous section, Dawson & Brawley (2000) examined the relationship between self-efficacy and goal-setting. The authors found a mediating effect for self-efficacy.

Another important consideration is regards to self-regulation is readiness to change. To begin self-regulation, one must be ready to begin change. Prochaska’s stage of change model cites that there are five stages of change: precontemplation, contemplation,
preparation, action, and maintenance. (Prochaska & Velicer, 1997). Persons in the precontemplation stage are not thinking about exercise and do not intend to exercise within the next 6 months. Persons in the contemplation stage or contemplating behavior change and plan to change within the next 6 months. Persons in the preparation are intending on changing in the next month. Persons in the action stage, have change a behavior, but have been doing so less than 6 months. Finally, persons in the maintenance stage have change a behavior and have done so for more than 6 months. So it may be that a person would have to be at least in the preparation stage in order for self-regulation to be a predictor of exercise.

For the purpose of the proposed study the SCT variables of self-efficacy and self-regulation will be measured. According to Bandura (1991), the combination of goals with performance feedback through self-monitoring, heightens motivation. To address this concept of self-regulation, individuals in the intervention group, will be required to keep a log in which they self-monitor their exercise behavior. Bandura (1991) suggests that people who set a reward system for goal attainment, generally accomplish more than those who do not set goals for themselves. Individuals in the treatment group will receive incentive such as; key chains, hand weights, jump ropes, pedometers, and gift certificates to various department stores in the area. For the purposes of the study, self-efficacy will be defined in terms of barriers to exercise. Participants in the intervention will devise plans of action to address barriers to physical activity.

Home-Based Physical Activity Studies

The purpose of this section was to conduct a review on home-based physical activity studies. In the literature “home-based” is usually characterized by a self-directed exercise regimen in which participants are not required to attend a structured exercise program at a fitness facility. A literature review using keywords “home-based” “lifestyle” “physical activity intervention” “physical activity programs” were imputed into Psychlit, PubMed, and Medline.
Seventeen articles were selected from that literature review. Lacking in that particular literature search are articles in which the intervention is implemented in the home. Home-based interventions could include: web-based interventions, emailed-interventions, phone-interventions, and mailed interventions. Mailed interventions were selected. The present study did not utilize the internet as a forum for intervention implementation, thus web-based and emailed articles were not included. Phone interventions were not searched as a separate literature search. Again, the present study did not use the telephone as a source for program implementation. Mailed interventions were selected to conduct a second literature review using keywords “mailed interventions” “mailed-based interventions”. An additional seven articles were selected. In all cases, the “mailed intervention” studies encouraged exercise that could be conducted in the home or neighborhood. A total of 24 articles were selected to be included into the review of literature (see Appendix J: Home-Based Studies Table). Inclusion criteria included: (a) at least one of the exercise regimens had to be home-based, (b) subjects had to be free of diseases that would limit physical activity (arthritic, cardiac rehab, cancer patients were excluded) (c) the exercise regimen describe had to be aerobic in nature (strength training was excluded), (d) the study had to be community-based (worksite articles were excluded), (e) the output described in the article had to be adherence or minutes/days of activity (articles that reported only physiology outputs-such as treadmill tests- were excluded).

Twenty-four articles were selected. However, some articles reported on the same study (see Appendix Home-based Studies Table). For example four articles were published on Project Active (Kohl, Dunn, Marcus, & Blair, 1998; Dunn, Marcus, Kampert, Garcia, Kohl, & Blair, 1997; Dunn, Garcia, Marcus, Kampert, Kohl, & Blair, 1998; and Dunn, Marcus, Kampert, Garcia, Kohl, and Blair, 1999). Five articles were published on Stanford Sunnyvale Health Improvement Project (King, Haskell, Taylor, Kraemer, & DeBusk, 1991; Garcia & King, 1991; King, Haskell, Young, Oka, Stefanick, 1995; Castro, King, & Brassington , 2001; Oman & King ,1998). The articles by Bock, Marcus, Pinto, & Forsyth (2001) and Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante (1998) are based on the same study. There are 24 articles, but
only 16 separate studies. For the remainder of the discussion “article” refers to a specific published article, “study” refers to the combined articles. The home-based section is broadly divided into two main categories: “Comparison of Exercise Regimen” studies and “Implementation Strategy” studies. Implementation strategy studies implement a home-based intervention via mailings (or phone calls). In most cases, the studies compare two types of implementation strategies (such as print mailings vs. phone calls). Some of the “exercise regimen studies” may use implementation strategies, but if the main purpose of the study was to compare exercise regimens, then the study was categorized into the “comparison of exercise regimen” group. The main difference is that the studies in the “implementation strategy” group do NOT compare exercise regimens.

Comparison of Exercise Regimens:

Of the home-based literature, seven studies compared exercise regimens. One study compared two home-based regimens (high intensity home vs. low intensity home) (Gossard, Haskell, Taylor, Mueller, et al., 1986). All the other six studies compared home-based exercise regimens to structured/group exercise regimens. Two studies (Perri et al.1997 and Andersen et al. 1999) compared home-based versus structured physical activity regimen in obese adults (diet + physical activity). The studies listed below will be discussed in the “Comparison of Exercise Regimens”. The Gossard et al. (1986) study will be discussed first. Followed by the Cox et al. (2003) study and the Opdenacker et al. (2008). Then the “diet + physical activity” studies will be discussed. Follow by the Stanford Sunnvale Health Improvement Project studies and the Project Active studies.

Studies Categorized as “Comparison of Exercise Regimens”

High Vs. Low Intensity Home-Based

Home-Based Exercise Regimen Versus Structured Exercise Regimen
*Cox, Burke, Gorely, Beilin, & Puddey (2003)
*Opdenacker, Boen, Coorevits, & Deleclus (2008)
Compare High Intensity Vs. Low Intensity Home-Based Regimens

The Gossard study (1986) conducted a study on sedentary men (n=64, average age=49±6). The 12 week study was a pretest/posttest design. Subjects were randomly assigned to: Control (n=20), Low-Intensity home-group (n=20), or High-Intensity home-group (n=23). Low-intensity group was to exercise 60-72% of their peak baseline treadmill heart rate and to expend roughly 300 kcal/session (52±5 min average), 5 times a week. The high-intensity group was to exercise 75-87% of their peak baseline treadmill heart rate and expend roughly 300 kcal/session (37 ± 7 min average), 5 times a week. All subjects (including control) completed exercise logs for 12 weeks. Logs were mailed and reviewed every 2 weeks. Subjects in the exercise regimens received phone calls every 2 weeks. For the low-intensity group, 96% self-reported adherence at 6 weeks and 96% self-reported adherence at 12 weeks. For the high-intensity group, at 6 weeks 93% self-reported adherence and at 12 weeks 90% self-reported adherence. Intensity of exercise regimen does not appear to impact physical activity rates for a home-based intervention. However, the study only last 12 weeks. Thus long-term adherence cannot be determined.
Home-Based Exercise Regimen Compared to a Structured Exercise Regimen

Six of the seven articles reported that the home-based group reported greater adherence. Only one study (Cox, Burke, Gorely, Beilin, & Puddey, 2003) reported that the structured group had greater adherence than the home-based group. A description of the Cox study (2003) follows below.

Cox, Burke, Gorely, Beilin, and Puddey (2003) conducted the Sedentary Women Exercise Adherence Trial (S.W.E.A.T.) on sedentary middle-ages women. The purpose of the study was to evaluate the relative effectiveness of a 6-month supervised program versus an unsupervised program on the adoption and maintenance of moderate and vigorous intensity exercise regimen. Recruitment occurred via media advertisements. To be considered sedentary, women had to meet the criteria of “no participation in regular physical activity for more than 20 minutes twice a week for at least 6 month.” Subjects were assessed on their stage of change at pretest. Physical activity was assessed using Blair’s (1984) 7-day physical activity recall (PAR). Retention was defined as number of subjects participating in the study at a set time period. Subjects were randomly assigned to one of four groups: home-based moderate intensity (40-55% of target heart rate)(n=32); home-based vigorous intensity (65-80% of target heart rate)(n=30); structured moderate intensity (40-55% of target heart rate)(n=31); and structured vigorous intensity (65-80% of target heart rate)(n=33). The structured exercise group exercised 3 times a week. The home-base group attended 10 training sessions in the first 5 weeks then exercised unsupervised at home 3 times a week for the next 6-18 months. Subjects were issued heart rate monitors to be used at least 2 weeks during the training sessions. Home-base participants were given written instruction, aerobic videotapes, and audio tapes. All four groups received stage-based written materials every six-months. It was assumed that at baseline, all subjects would be in the preparation/contemplation stage. At 6 -12 months, it was assumed that subjects had moved to the action stage, and at 18 months, the maintenance stage. The home-based group received
phone calls every six weeks following the training sessions. At baseline, there was no significant difference on any of the measured variables. Overall, the structured groups had higher retention over the 18 months than the home-based groups (p<.05). When the two structured groups were combined, 18 subjects had dropped out. When the two home-based groups were combined, 47 dropped from the study. However, when retention rates are broken up into the 4 groups over 6, 12, and 18 months, the difference appears to be with the structured moderate-intensity group. Over the 18 months, no subject who were assigned to the structure moderate-intensity group, dropped out of the study. In regard to adherence to the exercise regimen (engaging in physical activity 3 times/week), the combined groups of the structured-exercise regimen had higher adherence than the combined groups of the home-base at 6 months (p<.0001). The average for the structured groups was 2.6 versus 1.9 for the home-based groups. At 12 months and at 18 months, adherence rates between the combined structured groups and the combined home-based groups were not significantly different. For intensity level, there was no significant difference between the moderate-intensity groups and vigorous-intensity groups at 6 months. However, at 12 and 18 months, moderate-intensity groups (77.5% at 12 months, 78.7% at 18 months) had higher adherence rates than vigorous-intensity groups (63.6% at 12 months, 72.4% at 18 months). In summary, the 18 month time period illustrates the largest increase in drop-out rates. The moderate-intensity structured exercise programs had higher adherence rates over the 18 month-period than both the home-based programs and the vigorous-intensity structured program. At 18 months, the vigorous-intensity group had the same drop-out rate (n=12) as the moderate-intensity home-based program and the vigorous-intensity home-based program. Intensity appears to be a factor for adherence to a structured-exercise program. However, intensity level does not appear to be a factor for home-based programs. The home-based moderate-intensity level group showed a similar drop-out rate as compared to the home-based vigorous intensity level group.

Opdenacker, Boen, Coorevits, & Deleclus (2008) conducted a study to evaluate the effects of a lifestyle intervention and a structured exercise intervention on physical activity in
older adults. Participants were randomly assigned to either a lifestyle intervention (n=60) or a structured exercise regimen (n=60). A control group (n=66) served as a comparison. Physical activity was measured using self-report, pedometers and accelerometers. The structured group was to engage in 3 weekly session lasting 60-90 minutes in length. No specific exercise regimen was prescribed for the home-based group. Rather subjects were encouraged to integrate physical activity into their lives. Home-based participants received 5 groups session to ensure proper performance as well as booster phone calls every 2 weeks. Behavioral strategies, such as self-efficacy, self-monitoring, social support, and motivational interviewing were incorporated into the phone calls. At 23 months, home-based participants reported higher levels of physical activity at 23 months as compared to the structured physical activity group.

**Diet + Physical Activity Interventions:**

Of the seven studies that compared a home-bases exercise regimen to a structured exercise regimen, two studies compare diet+structured physical activity regimen to a diet+home-based physical activity regimen (Perri, Martin, and Notelovitz, 1997 and Andersen, Wadden, Bartlett, Zemel, Verde, and Franckowiak, 1999). In both studies, participants attended group-based dietary modification classes. The comparison was between a structured physical activity regimen and a home-based regimen. The Andersen et al (1999) intervention lasted 16 weeks (reports 1-yr follow-up), while the Perri et al. (1997) study lasted a full-year. However, both studies reported that weight loss was not significantly different between the groups. Both studies reported that the home-based exercise group had slightly better adherence than the structured exercise group.

Perri, Martin, and Notelovitz (1997) conducted a study on the effectiveness of home-based versus group-based interventions in the context of obesity treatment. The purpose of the study was to investigate the comparative effectiveness of group-versus-home-based exercise in a sample of sedentary, middle-aged obese women. Newspaper advertisements
were used to recruit women who were 40-60 years of age, had a Body Mass Index (BMI) of 27-45, and were not engaging in a regular physical activity program. Forty-nine women participated in the study. The average age was 48.77 years (SD=5.56) and a mean BMI of 33.59 (SD=3.81). Participants were assigned randomly either to behavioral weight loss treatment plus group-based exercise (n=25) or to behavioral weight loss treatment plus home-based exercise (n=24). Participants attended weekly 2-hour group sessions, with 12 to 14 members per group, for the first 26 weeks. During the 26 weeks, participants were taught behavioral weight management techniques (such as stimulus control, self-monitoring). From week 27-52, bi-weekly group sessions were provided that focused on problem solving of obstacles to maintaining changes in eating and physical activity. The exercise regimens for both groups were equal, with participants instructed to develop a walking program with a target level of 60-70% maximum heart rate, 30 minutes, 5 days a week. Activities could be in a single bout or accumulated in smaller bouts. Group-based exercise training sessions were held at a clinic facility. The clinic facility was equipped with seven motorized treadmills that were available for the group from 4-7 p.m. Home-based exercise prescription was similar to that of the group-based exercise prescription, except participants were encouraged to engage in the walking program in their home or work environment. All participants were instructed to complete logs for each exercise session, including exercise type, frequency, duration, and heart rate. At baseline, 6 months, and 12 months all subjects were required to participate in a Bruce protocol. All subjects were to keep written self-monitoring diaries of daily food intake. Seven subjects dropped from the group-based exercise condition and one dropped from the home-based exercise condition. Attendance rates from baseline to Month 6 were the same for group-based and home-based conditions. During Month 7-12, attendance declined in both conditions, with an average attendance of 54.2% from group and 71.5% from the home-based. Over the course of 12 months, participants in the home condition reported a significantly higher percentage of exercise completion versus those in the group condition [t(46)=2.12, p<.04]. Participants in the home condition also reported a marginally significant
greater frequency of exercise per week than those in the group condition \( t(46)=1.97, p<.06 \). The number of weeks of full adherence declined significantly during Months 7-12 in the group condition only. The home-based condition had significantly more weeks of full adherence than group condition group (Perri, Martin, & Notelovitz, 1997).

Andersen, Wadden, Bartlett, Zemel, Verde, and Franckowiak (1999) conducted a study comparing adherence and weight loss for a lifestyle activity program versus a structured exercise program for obese women. The purpose of the study was to examine short and long term changes in body weight produced by diet combined with either structured aerobic exercise or moderate-intensity lifestyle activities. At baseline, subjects underwent a personal interview. Persons with an eating disorder or any depression disorders were excluded. Participants were asked not to participate in another weight loss program for one year (68 weeks). Participants were 40 women, with a mean age of 42.9 (sd 8.3) years, mean weight of 89.2 kg (sd 11.6), average height 165.0 cm (sd 7.1), and an average body mass index [BMI] of 32.9 (sd 4.3). All women reported not participating in a structured exercise program for 6 months prior to the start of the study. Subjects were randomly assigned to 1 of 2 exercise conditions. Regardless of exercise condition, participants were provided with the same dietary intervention. Participants attended 16 weekly, 69-minutes sessions in groups of 10 members. Subjects were asked to consume low-fat, low-calorie foods to maintain a total caloric intake of 1200 kcal/ day. Participants that were randomly selected into the diet plus structured exercise program were to attend 3 step aerobic classes. Each aerobic class was 45 minutes in length. Participants in the lifestyle group were prescribed to increase their level of moderate-intensity physical activity by 30 minutes per day on most days of the week. Lifestyle participants were taught how to incorporate short bouts of activity into their daily lives. Subjects kept daily records of their minutes of physical activity. Lifestyle participants were given a 3-dimensional accelerometer to wear each week to provide ongoing feedback about their levels of physical activity. Data from the accelerometer was downloaded each week. At baseline, the structured group and the lifestyle group did not differ according to age, weight, or measured fat.
Repeated analysis of variance was used to determine group differences and differences over time. Ninety-eight percent of the total number of subjects completed the 16 week study; and 82% completed the entire year. There was no difference in attendance of weight loss classes between the structured or the lifestyle group. Weight loss of the 2 groups did not differ at any time; however percentage of body fat was significantly lower in the structured program versus the lifestyle program ($p<.001$). At one year follow-up, 55.6% of the lifestyle group and 48.2% of the structured exercise group reported engaging in regular moderate activity. This study supports that structured vs. lifestyle activity both produce weight loss, however the lifestyle group has slightly better adherence (Andersen, Wadden, Bartlett, Zemel, Verde, and Franckowiak, 1999).

**Stanford Sunnyvale Health Improvement Project:**

Five articles were published based on the Stanford Sunnyvale Health Improvement Project [King, Haskell, Taylor, Kraemer, & DeBusk (1991); Garcia & King (1991); King, Haskell, Young, Oka, Stefanick (1995); Oman & King (1998); Castro, King, & Brassington (2001)]. To be eligible for the Stanford Sunnyvale Health Improvement Project participants: had to be a resident of the community; aged between 50 and 65 years; absence of disease; sedentary (no participation in a regular program 2-3 times a week for at least 20 minutes); not taking current medication; postmenopausal and not taking medication or hormones; and willingness to be randomly assigned to a condition. Individuals were recruited through a random-digit dial telephone survey. Subjects were randomly assigned to four groups: assessment only, high-intensity group-based; low-intensity home-based, and high-intensity home-based. The ‘assessment only’ group was asked not to change their current activity habits for the 12-month study. The high-intensity group-based participants were to exercise at a local community center. Exercise sessions were conducted in the morning, late afternoon, and early evening.
six days a week. Each session lasted 60 minutes. Participants were encouraged to attend three classes per week. Subjects in the group-based exercise training were asked to complete in-class attendance sheets that including recording heart rates (King, Haskell, Taylor, Kraemer, & DeBusk, 1991).

Home-based participants were given a 30-40 minute introductory session in which participants were trained how to take their pulse. Written information and activity logs were provided for the home-based participants. No reliability or validity was reported. Staff members contacted participants by telephone at home the following week to check on progress. Telephone contact was made once a week for the first 4 weeks, biweekly for the following 4 weeks, and then once monthly for the remaining months. Lower-intensity home-based exercise training was based on a heart rate of 60-73% of target heart rate. Lower-intensity home-based exercise training participants were asked to participate in five 30 minute session per week. High-intensity home-based training had similar exercise training regiment as compared to the structured group-based participants. High-intensity home-based participants were asked to exercise 3 times a week for 60 minutes, at 73-88% of their target heart rate. At baseline, 6 months, and 12 months all subjects performed a treadmill exercise test (King, Haskell, Taylor, Kraemer, & DeBusk, 1991).

Average monthly adherence rates across the 12-month period were calculates as follows: number of exercise session reported as a percentage of exercise sessions prescribed for the month. All home-based participants were asked to complete logs, describing the exercise type, frequency, duration, heart rate, and rating of perceived exertion. Of the 2668 participants who were contacted through the random-digit dial telephone survey and the 449 participants who responded to the city-wide campaign, the sample consisted of 1362 eligible participants (King, Haskell, Taylor, Kraemer, & DeBusk, 1991).

King, Haskell, Taylor, Kraemer, and DeBusk (1991) conducted an ANOVA to evaluate between group differences at baseline with respect to exercise adherence. A significant main effect was found for exercise programs at 12-month measurement (F[2266]=7.76, p<.0005).
Subjects in the high-intensity and low-intensity home-based exercise regimens reported higher means of adherence (mean of 78.7% ± 33.9% for the high-intensity group and 75.1% ± 31.8% for the low-intensity group) as compared to the structured group-based regimen (mean of 52.6% ± 29.8%). This statistic indicates that 78.7% of the high-intensity home-based participants; 75.1% of low-intensity home-based participants; and 52.6% of the structured group adhered to their prescribed exercise regimen over the 12 months. There was no significant difference for exercise adherence rates between the high-intensity home-based group and the low-intensity home-based group. This study indicates that home-based exercise regimens, regardless of intensity level, can result in higher adherence rates than structured-group based programs (King, Haskell, Taylor, Kraemer, & DeBusk, 1991).

Garcia and King (1991) questioned participants on self-motivation, self-efficacy, and perceived exertion, enjoyment, and convenience. Self-efficacy was measured using 14-items that were rated on a scale of 0-100% the level of confidence one had to overcome specific barriers to exercise. Self-motivation was measured using Dishman’s et al. (1980) Self-Motivation Inventory (SMI). This instrument contains 40 items with a 5-point Likert scale. Nineteen items were positively skewed and 21 were negatively skewed. The total score for the SMI was obtained by taking the average item score for all subjects and then multiplying this by 40. Self-motivation and self-efficacy had established reliability and validity. Subjects were asked to rate each exercise bout in terms of perceived exertion, enjoyment, and convenience (PEEC). No reliability or validity were reported for the PEEC instrument. A Pearson correlation was conducted to determine whether self-efficacy or self-motivation was the better predictor for adherence at 1-6 months and at 7-12 months. The groups were combined for this test. Self-motivation was non-significant at both test points. However, self-efficacy was significant at 1-6 months ($r=.42, p<.001$) and at 7-12 months ($r=.44, p<.001$). A multiple regression analysis was then conducted to determine if exercise experience (exertion, enjoyment, and convenience) was significant predictor of exercise adherence (months 7-12) independent of self-efficacy and self-motivation. The variables entered in the
model were: self-efficacy, self-motivation, group assignment (supervised vs. two home-based interventions; and higher intensity home-based vs. lower intensity home-based); and exercise experience (perceived exertion; and combined enjoyment/convenience). The significant predictors were self-efficacy ($r^2$ change = .17, $p<.05$) and group assignment ($r^2$ change = .12, $p<.05$). Group assignment was a significant predictor of exercise adherence, with the home-based groups reporting higher rates of adherence as compared to the structured-group. These results also indicate that self-efficacy is a better predictor of exercise adherence than self-motivation. (Garcia and King, 199).

King, Haskell, Young, Oka, and Stefanick (1995) conducted an analysis of variance to determine between-group differences. The results would indicate that during year one, there was not a significant difference between the higher-intensity home-based participants and the lower-intensity home-based participants. However there was a significant difference ($p<.005$) between the higher-intensity home-base subjects (mean of 78.7% ± 33.9%) and the group-based exercise regimen (mean of 52.6% ± 29.8%). The lower-intensity home-based group (mean of 75.1% ± 31.8%) was also significantly different than the group-based exercise regimen ($p<.005$). At the end of year 2, adherence rates for the higher-intensity home-based participants (mean of 67.8% ± 46%) were higher than the higher-intensity group-based participants (mean of 36.4% ± 33%). The average adherence rate for the lower-intensity home-based group was 49 ± 42.7%. This study reveals a high-intensity home-based regimen has the highest adherence rate, followed by the lower-intensity home-based regimen. The higher-intensity group-based regimen has the lowest at year 1 and year 2 (King, Haskell, Young, Oka, & Stefanick, 1995).

Oman and King (1998) investigated the relationship among self-efficacy, changes in self-efficacy, and exercise adherence. Self-efficacy was measured using Garcia and King (1991) self-efficacy instrument. Exercise behavior was measured using exercise logs. Reliability and validity were not reported for exercise logs. Exercise behavior was analyzed separately at three phases: adoption (Months 1-6); early maintenance (Month7-12); and long-
At the adoption phase and early maintenance phase, baseline self-efficacy and exercise format (home vs. class) were significant with year one exercise. Examining the means, it was determined that compared to subjects in the class-based condition, subjects in the home-based conditions had greater adherence rates at adoption (88% home vs. 66% class) and early maintenance (80% home vs. 52% class). Multiple regressions were analyzed on the data. Baseline self-efficacy (p<.001) and exercise format (p<.024) were significant predictors of 1-6 month exercise adherence. A similar pattern was found for 7-12 exercise adherence, in which both self-efficacy (p<.001) and exercise format (p<.01) were significant predictors. It was revealed that self-efficacy had a positive effect only on the home conditions. However, the analysis for Year 2, revealed a different pattern. Year-one self-efficacy (p=.392) nor exercise format (p=.329) were significant predictors of Year 2 exercise adherence. It would appear that at one year, baseline self-efficacy and home-based exercise condition were determinants of exercise adherence. However, at the long-term maintenance phase, baseline self-efficacy and exercise regimen were not significant with year two exercise. These results would indicate that self-efficacy and type of exercise format (home vs. class) are important for exercise adoption and early adherence, but not for long-term adherence (Oman & King, 1998).

Castro, King, and Brassington (2001) reported Year 2 results from the Stanford Sunnyvale Health Improvement Project. This study reports only on the home-based groups. After the first year, home-based subjects were randomly assigned to “Telephone + Mailing” group or “Mailing-Only” group. Both groups received the same educational material. Both groups received monthly written, educational material that focused on relapse prevention and maintenance of physical activity. There were 12 mailings in all. Both groups received weekly phone calls for the first four-weeks. Telephone calls were used to monitor progress, identify barriers, discuss motivation factors, social support, and self-reward. The “Telephone + Mailing” group received monthly phone calls for the rest of year, in addition to the monthly mailings. The “Mailing-Only” group did not receive any phone calls past the first four weeks,
but did continue to receive the monthly mailings. The study revealed that the high intensity home-based group had significantly higher adherence (73%) as compared to the low intensity home-based group (57%) (p<.02).

Project Active:

Four articles were published on Project Active [Kohl, Dun, Marcus, & Blair, (1998), Dunn, Marcus, Kampert, Garcia, Kohl, & Blair (1997), Dunn, Garcia, Marcus, Kampert, Kohl, & Blair (1998) and Dunn, Marcus, Kampert, Garcia, Kohl, & Blair (1999)].

Project Active was a two-year randomized trial designed to evaluate the 6 month and 24 month effectiveness of two different interventions to promote physical activity among initially sedentary community residents (Kohl, Dunn, Marcus, & Blair, 1998). The purpose of the study was to compare a lifestyle physical activity program with a structured exercise program in changing physical activity. Participants were 235 healthy sedentary men (n=119) and women (n=119), aged 35 to 60 years of age who lived or worked within a 10 mile radius of the Cooper Institute. Subjects were randomly assigned to either a lifestyle group or a structured exercise program group. Participants were recruited in 3 cohorts, randomized at 6-month intervals. Exclusion criteria included: self-report history of heart disease, stroke, diabetes, osteoporosis, or osteoarthritis; weight more than 140% of ideal body weight; plan to move from area during study; 3 or more drinks of alcohol daily; not exercising 3 days a week for 20 minutes; blood pressure of 160/100 mm Hg or more; use of medications that would inhibit exercise performance; and for women, plan to become pregnant in the next two years. Following telephone screening, participants were invited to an orientation session to obtain written informed consent and determine baseline physical activity using the 7-Day Physical Activity Recall (PAR). Participants were scheduled for a laboratory assessment. A physician reviewed their medical history and performed a physical examination. Subjects who met eligibility were then scheduled for a second laboratory examination, in which height, weight, body fat, and a maximal graded treadmill test were measure. Within 6 weeks, participants
were randomly selected into 1 of 2 groups. All baseline screenings were repeated at 6 and 24 months. Participants in both groups received 6 months of intense intervention, followed by 18 months of maintenance intervention. Participants randomized to the structured exercise group received a traditional exercise prescription (exercise intensity 50-85% of maximal aerobic power for 20-60 minutes). Individual supervised sessions were offered 5 days a week for 6 months at a state-of-the-art fitness center. Participants were asked to attend 3 sessions initially, and then to progress to 5 sessions per week. Following 3 weeks of initial instruction and supervision, structured program participants could choose any available activity that was offered at the fitness center. Participants who failed to attend at least 1 session per week were contacted and encouraged to resume regular exercise. During the 18 month follow-up, the structured group met quarterly for group activities. They also received a monthly calendar and quarterly newsletter. Participants who were randomized to the lifestyle group were advised to accumulate at least 30 minutes of moderate-intensity on most, preferably all, days of the week (ACSM,1990). Lifestyle participants met for one hour for the first 16 weeks, and then biweekly until week 24. Participants learned behavioral and cognitive strategies to increase physical activity. Participants were given weekly homework assignments. During the 18 month maintenance, meetings were held monthly, then bimonthly, and finally tri-monthly. Participants also received a monthly calendar and a quarterly newsletter. The purpose of the lifestyle group was to provide a less complicated, more convenient, less intimidating, and inexpensive program that required no special equipment. The lifestyle approach was based concepts from the Social Cognitive Theory and the Transtheoretical Model (See Table 2.3) (Kohl, Dun, Marcus, & Blair, 1998).
<table>
<thead>
<tr>
<th>Week</th>
<th>Session Title</th>
<th>Behavioral/Cognitive Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Getting to know you: Monitoring sedentary activities/substituting alternatives</td>
<td>Consciousness raising, counter-conditioning</td>
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<tr>
<td>2</td>
<td>Understanding barriers: List personal barriers and benefits/working in short bouts of activity</td>
<td>self-re-evaluation, social liberation</td>
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<tr>
<td>3</td>
<td>Setting goals: Assessment of enjoyable physical activities/demonstration of energy intensity</td>
<td>Consciousness raising</td>
</tr>
<tr>
<td>4</td>
<td>Enlisting aid: Identification of social support sources and types of support</td>
<td>Helping relationships, self-liberation</td>
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<tr>
<td>5</td>
<td>Getting confident: Reflection on overcoming barriers/problem solving; overcoming obstacles</td>
<td>Increasing self-efficacy</td>
</tr>
<tr>
<td>6</td>
<td>Lapsing, relapsing, collapsing: Planning for transitions, problems</td>
<td>Increasing self-efficacy</td>
</tr>
<tr>
<td>7</td>
<td>Scavenging for physical activity: Physical activity designed to have participants think of alternative, non-traditional ways to be active</td>
<td>Social liberation, counter-conditioning</td>
</tr>
<tr>
<td>8</td>
<td>Rewarding yourself: Choosing appropriate rewards for reaching short or long term goals</td>
<td>Reinforcement management; self-liberation</td>
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<tr>
<td>9</td>
<td>Understanding your change behavior: Discussion of how participants have changed health habits in the past</td>
<td>Consciousness raising</td>
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<tr>
<td>10</td>
<td>Nutrition: Provide feedback on dietary records</td>
<td>Consciousness raising</td>
</tr>
<tr>
<td>11</td>
<td>Managing stress: Stress management techniques overview/Using physical activity to overcome stress</td>
<td>Counter-conditioning. Self re-evaluation</td>
</tr>
<tr>
<td>12</td>
<td>Time management: Prioritizing daily activity to fit in physical activity</td>
<td>Decision-making. Social liberation</td>
</tr>
<tr>
<td>13</td>
<td>Scouting physical activity in your community: Work with maps, resource guides to find new activities</td>
<td>Environmental re-evaluation; helping relationships</td>
</tr>
<tr>
<td>14</td>
<td>Reviewing Goals: Use of step counter to monitor activity and set goals</td>
<td>Stimulus control</td>
</tr>
<tr>
<td>15</td>
<td>Physical Activity Fair: Discussion of activities and demonstration of favorite activities</td>
<td>Self-liberation, increasing self-efficacy</td>
</tr>
<tr>
<td>16</td>
<td>Cognitive restructuring and relapse prevention revisited: Learning how to change all or none thinking, planning for relapse</td>
<td>Counter-conditioning; self-re-evaluation</td>
</tr>
<tr>
<td>18</td>
<td>Mall walking: Field trip to local mall and exposure to programs offered by malls</td>
<td>Counter-conditioning; reinforcement management</td>
</tr>
<tr>
<td>20</td>
<td>Scavenger Hunt: Finding alternative activities; knowledge test</td>
<td>Consciousness raising</td>
</tr>
<tr>
<td>22</td>
<td>Volleyball: Inviting family and friends for social physical activity</td>
<td>Helping relationships; substituting alternatives</td>
</tr>
<tr>
<td>24</td>
<td>Transition party: Moving into next phase with less staff contact</td>
<td>Consciousness raising; dramatic relief; self re- evaluation; reinforcement management</td>
</tr>
</tbody>
</table>
Sample size estimation was used to predict the number of study participants necessary to detect a 3 mL•kg-1 min-1 or a 2 kcal kg-1 d-1 differences between the two interventions groups at the end of the 24 months. An estimated 15% per year dropout rate was assumed as a power of 90% and an alpha of 0.05. These calculations led to a planned recruitment goal of 35 men and 35 women for each of the three cohorts for a total study goal of 210 individuals. The total sample for Project Active was 235, thus determined to be adequate for detecting treatment differences (Kohl, Dunn, Marcus, & Blair, 1998).

The population was sedentary, thus not meeting 1990 CDC/ACSM criterion at baseline. After 6 months, 78% of the lifestyle group were meeting the CDC/ACSM guidelines (accumulate 30 minutes of moderate activity, 5 times a week) while 85% of the structured group were meeting the CDC/ACSM guidelines (20-60 minutes, 3 to 5 days week for moderate/vigorous activity). Separate multiple logistic regressions were performed to compare use of behavioral strategies and those who met the CDC/ACSM requirements. For both the structured exercise group and the lifestyle group, those who increased their use of behavioral strategies, cognitive strategies, self-efficacy, and the benefits to barriers index were more likely to achieve the CDC/ACSM criterion. Among the lifestyle group and the structured group, the most important behavioral strategies were substituting alternatives and enlisting support. The only cognitive strategy that was useful was increasing knowledge for the structured exercise group (Dunn, Marcus, Kampert, Garcia, Kohl, & Blair, 1998).

Dunn, Garcia, Marcus, Kampert, Kohl, and Blair (1998) revealed that at 6 months, both the lifestyle group and the structured group significantly increased energy expenditure over baseline (p=.0001). The lifestyle group increased their physical activity by 4.6% and the structured exercise group increased their physical activity by 4.0%; however this difference is not significant. According to the PAR at month 6; the percentage decrease for hours sitting was 9.3% for the lifestyle group and 12.1% for the structured group. Stairs climbed increased by 64.0% and minutes walked increased by 25.0% for the lifestyle group. The structured exercise group increased stairs climbed by 30.2% and minutes walked by 20.9%. A MANOVA
revealed a significant gender difference for total activity (p<.001), moderate activity (p<.001), hard activity (p<.02), and very hard activity (p<.01); with men having higher levels (Dunn, Garcia, Marcus, Kampert, Kohl, and Blair, 1998).

Dunn, Marcus, Kampert, Garcia, Kohl, and Blair (1999) analyzed the Project Active data at 24 months. Completion of the intervention was not significantly different between the groups at 6 months or at 24 month. At 6 months, 109 lifestyle participants and 103 structured participants completed the program. At 24 months, 100 lifestyle participants and 90 structured participants completed the program. Both groups significantly increased total energy expenditure from baseline to 24 months [p<.001 for lifestyle and p<.002 for structured]. Lifestyle participants increased their moderate intensity activities nearly 3 times than the structured participants. However this difference is not significant (p=.63). The structured exercise group increased their vigorous physical activity by 2 times as compared to the lifestyle group. This difference is also non-significant (p=.08). Maintenance was defined as percentage of participants who regularly engaged in moderate intensity (30 minutes, 5 days a week) over the 72 weeks in the maintenance program. Thirty-nine percent of the lifestyle group and 35% of the structured groups had maintained an adherence of 70% or more for the maintenance program. The difference is non-significant. This study would suggest that a lifestyle program that incorporates moderate activities has about the same adherence as a structured moderate-intensity exercise program.

Implementation Strategies:

Eleven articles were found that used implementation strategies. One article, Castro, King, & Brassington (2001) was discussed in the “Comparison of Exercise Regimens”, thus only the implementation strategy portion will be discussed. Two studies (Bock, Marcus, Pinto, & Forsyth, 2001 and Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante, 1998) are based on the same study and will be discussed together. Thus, a total of 10 studies were found that used implementation strategies. Nine of the ten studies compare implementation strategies.
Two studies compare participants who receive a phone prompt and those who do not (King, Taylor, Haskell, and DeBusk, 1988 and Nies, Chrucial, & Hepworth, 2003). One study compares a class-room intervention to a mail + telephone intervention (Heesch, Masse, Dunn, Frankowski, and Mullen, 2003). One study compares a mail-only group to a mail + postcard booster (Levy and Cardinal, 2004). Two studies compare a mail-only group to a mail + telephone group (Humpel, Marshall, Iverson, Leslie, & Owen, 2004 and Castro, King, & Brassington, 2001). Three studies utilized stage-based brochures or booklets (Marhall, Bauman, Owen, Booth, Crawford, & Marcus, 2003; Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams, 1992; and Bock, Marcus, Pinto, Forsyth, 2001; Marcus, Bock, Pinto, Roberts, & Traficaconte (1998).

Below is an outline for the Implementation Strategy Articles.


Comparing Implementation Techniques:

Phone Prompt Versus No Phone Prompt
  • King, Taylor, Haskell, and DeBusk (1988)
  • Nies, Chrucial, & Hepworth (2003)

Classroom-group Intervention Versus Mail + Telephone Intervention
  • Heesch, Masse, Dunn, Frankowski, and Mullen (2003)

Mail-Only Versus Mail + Booster Postcard
  • Levy and Cardinal (2004)

Mail Versus Mail + Telephone
  • Castro, King, & Brassington (2001)

Stage-Based Strategies
  • Marshall, Bauman, Owen, Booth, Crawford, & Marcus (2003)
  • Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams (1992)
  • Bock, Marcus, Pinto & Forsyth (2001) and
  • Marcus, Bock, Pinto, Forsyth, Roberts, & Traficaconte (1998)
Wilbur, Miller, Chandler, and McDevitt (2003) conducted a study on 153 African-American and Caucasian women who agreed to participate in a moderate-intensity 24-week home-based walking program. The purpose of the study was to identify which determinants of physical activity among African American and Caucasian women predict adherence to a 24-week home-based walking program. Eligibility criteria included: healthy, employed, between the ages of 45-65, and sedentary in their leisure time. No comparison group was utilized. Sedentary behavior was defined as not participating in either moderate to high intensity leisure time physical activity for 20 minutes or more per session two or more times a week during the preceding 6 months. The sample included 153 mid-life women (67% Caucasian and 33% African-American). All instruments had established reliability and validity. Self-efficacy was measured using McAuley’s barriers to exercise (Cronbach’s alpha=.92) (McAuley & Jacobson, 1991). Self-determinism was measured using the Exercise Self-Determinism Index (Cronbach’s alpha=.76). Adherence to walking was measured using a Polar heart rate monitor and record keeping of each session. The heart rate monitor provided an objective measure of adherence. Heart rate data was transferred to a computer every 2 weeks. Adherence was calculated as a percentage of the expected 96 walks (4 walks per week for 24 weeks). The intervention consisted of personal exercise prescription, instructions, and support from a nurse research team member. At the start of the intervention phase of the 24-week home-based walking program, all women were given an exercise prescription that was standardized to mode (walking), frequency (4 times a week), and duration (increasing within the first 4 weeks from 20 to 30 minutes of continuous walking). Intensity of walking was personalized to be 50-74% of each women’s maximal heart rate as established by her maximal aerobic test established by use of a treadmill. Instructions were standardized through the use of a videotaped presentation and orientation to the exercise prescription, walking techniques, and use of heart rate monitor, and use of exercise log. Each woman received a manual, exercise log, heart rate monitor, and a fanny pack. After each pre-intervention and post-intervention data collection, the women received $25 to compensate for time and travel.
A nurse met with each woman every 2 weeks to provide emotional support and reinforcement and to transfer heart rate monitor to a laptop computer. T-tests were analyzed to determine differences between pre-intervention and post-intervention. Adherence was defined as percentage of the 96 expected walks (4 walks per week for 24 weeks). The results revealed the average adherence to frequency was 66.5%. Adherence was significantly higher for Caucasian women than for African-American women. Results from the t-tests were completed on 136 women who had given pre and post data. Self-efficacy and self-determinism changed significantly from pretest to posttest. Over the 24 weeks, self-efficacy (ability to overcome barriers) decreased while self-determinism increased (intrinsic motivation to exercise). Demographics (age, ethnic group, marital status, number of children, education, professional status) and previous exercise experience were regressed on self-efficacy. Only age was significantly predictor of self-efficacy (p= .043). Demographic factors and previous exercise experience were regressed on self-determinism. Education (p= .008) and previous exercise experience (p= .008) were significantly associated with self-determinism. Demographic factors, previous exercise experience, self-efficacy, and exercise self-determinism were regressed on frequency of adherence of walking. Ethnic group (p= .001), previous exercise experience (p= .015), and self-efficacy for exercise (p= .033) was significantly associated with frequency of walking. These results would indicate that there is a racial difference in walking adherence. Caucasian women reported greater adherence than African-American females. Self-efficacy appears to be reduced over the course of 24 weeks. This could be due to barriers that the women face within the time frame of the study. These barriers could, in return, reduce self-efficacy (Wilbur, Miller, Chandler, and McDevitt, 2003).
Comparing Implementation Techniques:

Nine studies were found that compared implementation strategies (see outline above).

**Phone Prompt Versus No Phone Prompt:**

Two studies were found that compared a group who received a phone prompt and a group who did not receive a phone prompt.

King, Taylor, Haskell, and DeBusk (1988) conducted a study examining adoption and maintenance of a home-based exercise program. The purpose of the study was to evaluate strategies for enhancing the adoption and maintenance of a 6-month randomized trial of home-based exercise-training. The study consisted of two phases. Phase 1 consisted of a 6-month moderate-intensity, home-based program. Eligibility criteria for Phase 1 included: being aged 40 to 60; being 25% or more overweight, and absence of major cardiopulmonary disease. Subjects were randomly assigned to either a control (n=60) or a treatment group (n=60). At the end of Phase 1, the remaining subjects (52 control, 51 treatment) were invited to participate in Phase 2. Subjects that served as the control in Phase 1 were entered into the adoption model in Phase 2. Subjects that served as the treatment group in Phase 1, served as the maintenance model in Phase 2. Twenty-six men and twenty-six females participated in the adoption model for Phase 2. All adoption model subjects participated in a treadmill test. Based on the treadmill test, participates were to exercise at 65% of their target heart rate, 4 times a week, for 30 minutes. Participants were instructed on the exercise regimen through a 15 minute face-to-face session followed by viewing a 15 minute videotape on exercise training. All adoption model subjects were given a heart rate monitor at this time. All participants were instructed on self-directed behavioral strategies including relapse prevention, self-monitoring, perceived rate of exertion, enjoyment and convenience of exercise session. No reliability or validity was reported for any measure. Subjects were to complete a log that was to be mailed to the staff once a month. If a log was more than 2 weeks late, subjects were called. Subjects in the adoption model were randomly assigned to
phone prompt (condition 1) or no phone prompt (condition 2). Subjects in condition 1 (phone prompt) received an average of 10 calls over the 6 month period. The purpose of the phone prompt was to offer assistance and guidance to the participants. For the adoption study, there was a significant difference of average monthly exercise sessions between condition 1 [phone prompt] (11.4 ± 6) and condition 2 [no phone prompt] (7.5 ± 6) (King, Taylor, Haskell, and DeBusk, 1988).

Participants who were a part of the treatment group in Phase 1 served as subjects for the maintenance model in Phase 2. Twenty-six men and twenty-five women participated as subjects for the maintenance model. The main strategy of the maintenance model was self-monitoring. Similar to the adoption model, maintenance model participants were randomly assigned to condition 1 or condition 2. Subjects in condition 1 returned logs on a monthly basis and were given phone prompts on adherence tips and guidelines. Subjects in condition 2 returned logs every 3 months and did not receive adherence phone prompts. However, both conditions were called if the log was more than 2 weeks late. Non-paired t tests were used to compare differences between groups, while paired t tests were used to compare within group differences. For the adoption study adherence was defined as the number of exercise sessions in a month, over the 6 month period. Condition 1 [phone prompt] subjects reported an average of 12.4 ± 6 and condition 2 [no phone prompt] subjects reported an average of 9.8 ± 8 (non-significant) exercise session in a month over the 6 month period. The duration of the average exercise session was not significant between condition 1 (mean of 32 minutes ± 6) and condition 2 (mean of 28 minutes ± 10). The number of exercise sessions reported was significantly correlated with the rated enjoyment of the sessions (r=0.46, p<.01) and with the rated convenience of exercise (r=0.40, p<0.01). This study supports that periodical phone calls improves exercise adherence during the adoption phase of activity (1-6 months). However during the maintenance phase (6-12 month) phone prompts are not a useful method for improving exercise adherence (King, Taylor, Haskell, & DeBusk, 1988).
Nies, Chrucial, & Hepworth (2003) conducted a walking study using a convenient sample of 197 women. Inclusion criteria included sedentary and free of physical activity limiting conditions. Participants were randomly assigned to one of three groups: (1) Intervention, (2) Attention-Control, (3) Control group. All participants were encouraged to walk 90 minutes per week. The intervention group received a phone call once a week for the first eight weeks, then every other week for the remaining 16 weeks. The calls were designed to provide counseling on exercise benefits, goal setting, exercise efficacy, social support, relapse prevention, and restructuring plans. Intervention calls were to last no more than 10 minutes. Attention-control participants received the same number of phone calls, but were only asked about physical activity. Attention-control calls lasted about 2 minutes. Control group participants received no phone calls. At baseline and at 6-months, participants were measured on exercise benefits, self-efficacy, goal setting, social support, mood, physical activity and fitness. Women who were in the intervention group, reported significantly more improvement in walking as compared to the control group (p<.05). The intervention group also reported significantly higher relapse prevention than the control group (p<.05). No difference was found for self-efficacy, perceived benefits, goal setting, or social support (p>.05). The article lacks comparison between the intervention group and the attention-control group so it is difficult to determine if more intense phone prompts are requires or if a mere inquiry of physical activity status is enough to promote an increase in physical activity.

Classroom Group Intervention versus Mail + Telephone Intervention:

Heesch, Masse, Dunn, Frankowski, and Mullen (2003) conducted the PRIME (Physically Ready for Invigorating Movement Everyday) study that included 244 healthy adults. The purpose of the study was to explore the relationship of adherence to a lifestyle physical activity intervention. The PRIME study was a 24-month randomized physical activity trial that included 6 month intervention phase and an 18-month follow-up. Physical activity was measured using a PAR developed by Blair (1985). The intervention consisted of two
groups, lifestyle group (PRIME G) and lifestyle correspondence (PRIME C). PRIME G participants attended group meetings and received curriculum materials weekly for 16 weeks and then biweekly for 8 weeks. During class participants were taught cognitive and behavioral strategies for incorporating moderate and physical activity into daily routines. Cognitive strategies included increasing knowledge, benefits, and self-efficacy. Examples of behavioral strategies include committing oneself, rewarding oneself, and enlisting social support.

Homework assignments were given to the participants. If a subject missed a class, audio tapes were mailed to them. At week 13, participants were asked to begin recording minutes of moderate and vigorous physical activities and steps taken a day. Participants were provided with a pedometer to calculate steps per day. All subjects were given a self-monitoring form at each class and the form was to be returned the following class (Heesch, Masse, Dunn, Frankowski, & Mullen, 2003).

Lifestyle correspondence (PRIME C) participants received the same intervention as PRIME G, but through mailing and telephone correspondence. Each month a health educator called the participant to discuss physical activity goals, level, and barriers. Participants received 4 months of intervention materials and homework. To ensure PRIME G and PRIME C were learning the same material at the same time, PRIME C participants were instructed as to the appropriate week to read the material and do the homework. Homework was to be completed during the month, and mailed back the following month. Each participant received a pedometer during month 4 and self-monitoring material months 5 and 6. Structural equation modeling was used as the analysis. Two models were developed, one for PRIME G (lifestyle group), and one for PRIME C (lifestyle correspondence). In the lifestyle group, adherence was considered a latent variable, measured by the manifest variables of homework completion, class attendance, and self-monitoring. In the lifestyle correspondence group, adherence was measured by the manifest variables of homework completion, phone call completion, and self-monitoring. For the lifestyle group model, homework completion (R=.74, p<.05), attendance (R=.93, p<.05), and self-monitoring (R=.81, p<.05) were associates with adherence; and
adherence (R=.32, p<.05) was associated with meeting the ACSM 1995 requirement (accumulate 30 minutes of moderate activity or vigorous activities 5 days a week, for a total of 150 minutes). For the lifestyle correspondence group, phone call completion (R=.64, p<.05) and self-monitoring (R=.81, p<.05) was associated with adherence. Homework completion was not associated with lifestyle correspondence program adherence. Adherence (R=.32, p<.05) was associated with meeting the requirements of the 1995 ACSM statement (Pate, et al., 1995). This suggests that participants who adhere to the exercise program are more likely to meet recommended guidelines (Heesch, Masse, Dunn, Frankowski, & Mullen, 2003). In comparing those who at follow-up were meeting the ACSM’s guidelines; subjects in PRIME C had higher rates of meeting ACSM’s guidelines (36.3%) than those in PRIME G (30.8%). The authors do not state if this difference is significant, but it appears that this study would support that a 6 month correspondence (through monthly telephone calls) produces higher exercise rates over time than a 6 month group intervention (Heesch, Masse, Dunn, Frankowski, & Mullen, 2003).

Mail versus Mail + Booster Postcard:
Levy and Cardinal (2004) conducted a study on sedentary adults. The purpose of the study was to examine the effect of a mail-mediated intervention, based on self-determinism theory, on adult exercise behavior. The sample consisted of 126 women and 59 men, with a mean age of 46.8. All participants completed the questionnaire at baseline and at 2 month posttest. Participants were randomly assigned to: Intervention-only, Intervention – plus-booster, or control group. Participants in the intervention-only group were mailed the intervention packet that consisted of behavioral and cognitive strategies to promote a sense of autonomy, competence, and relatedness to exercise behavior. Intervention+booster group received the same packet as the “intervention-only” group, but also received a booster postcard at one month. The control group received an educational packet based on information from the American Heart Association. Analysis included a 3 X 3 repeated
measure ANOVA. No significant group effect or interaction effect were found (p>.05). All women reported significant increase in exercise behavior at one-month and at two months (p<.001). The author suggested that although overall physical activity rates increased, the intervention was inadequate to detect differs between groups. The author suggests that more intensive interventions need to be developed.

Mail Versus Mail + Telephone:

Two studies compare a “mail-only” implementation strategy to a “mail + telephone” implementation strategy (Humpel et al, 2004 and Castro et al., 2001).

Humpel, Marshall, Iverson, Leslie, & Owen (2004) conducted a study examining the effectiveness of print material versus telephone counseling in promoting walking behavior. The sample consisted of 399 adults aged 40 or older (average age 60 ± 11 years; 61% women). Data was collected at baseline and 8-10 weeks posttest. Participants were randomly assigned to one of two groups: Print (n=288) or Print Plus Telephone (n=111). Both groups were mailed one brochure each week for three weeks. The brochures were double-sided A-4 page folded brochure style. Brochure 1 suggested looking at places around the neighborhood that encouraged walking. The brochure also covered information about the benefits of walking, how much walking is needed for health benefits, and barriers for walking. Brochure 2 was specifically aimed at helping participants identify and plan opportunities for walking and how to monitor walking behavior. Brochure 2 also included local walking paths and trails. Brochure 3 offered ways to keep motivated and suggestion for social support. Participants in the Print Plus Telephone group also received one telephone call each week for the 3 weeks. The calls were designed to be brief and to answer any questions and to resolve any concerns about behavior change. Walking was assessed by four items to assess frequency and duration of walking. Participants were also questioned on how useful they found the print material and the telephone calls. The results revealed that over 57% percent of the Print group and 68% of the Print Plus Telephone group reported the brochures to be moderately to extremely useful. Around 33% of the Print group and 40% of the Print Plus Telephone group
reported the brochures moderately to very much influenced level of walking. The telephone calls were reported moderately to extremely useful by 57% of the Print Plus Telephone participants, and 42% reported the telephone calls moderately to very much influenced their walking. No significant difference was found between the groups on any of the walking measures (p>.05). However, both groups significantly increased the reported number of walking minutes (p<.05). The study reveals that telephone calls increase awareness of the program, but that awareness does not equal increased walking behavior. This study would support that a short-term, minimal contact walking intervention can have an impact on walking behavior. The limitation of the study is that walking behavior is not measured past 1-month posttest, so long term effects of the intervention cannot be assessed.

The Castro, King, & Brassington (2001) study also compared mail versus mail + phone implementation. During the first year of the study, all participants in the Stanford Sunnyvale Health Improvement Project received phone calls every week for the first four weeks, biweekly for the next four weeks, then once a month for the remaining year. Only the home-based group received a second year intervention. Home-based groups were stratified according to intensity (King, Haskell, Taylor, et al., 1991) then randomly assigned to: “telephone + mail” group or “mail-only” group. Both groups received the same educational material and received weekly phone calls for the first four weeks. After the first four weeks, the “mail-only” group did not receive further phone calls. The “telephone + mail” continued to receive phone calls monthly phone for the remainder of year 2. Mail-only participants had higher adherence than the telephone + mail group (p<.05). The authors note that since all participants received phone calls during the first year, the phone calls received in the second year may have not added any benefit.

These studies indicate that the phone prompts may increase awareness of the program, but the usefulness of telephone prompts is limited.
Stage-Based Mailed Interventions:

Four articles published results on interventions that mailed stage-based brochures [Marshall, Bauman, Owen, Booth, Crawford, & Marcus (2003); Bock, Marcus, Pinto & Forsyth (2001); Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante (1998); and Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams (1992)]. Two articles [Bock, Marcus, Pinto & Forsyth (2001); Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante (1998)] published results based on the same study. Three studies were found that mailed stage-based brochures as the intervention.

Marshall, Bauman, Owen, Booth, Crawford, & Marcus (2003) examined the effects of a mailed stage-based print intervention designed to promote physical activity. Participants (n=462, adults 40-60 years old) were randomly assigned to intervention group (n=227) or control group (n=235). Participants in the intervention group received four “Active Living” booklets based on Transtheoretical Model’s Stage of Change. All booklets were tested for readability. Participants received all four booklets in one-mailing. Control participants did not receive an intervention. Measurements included a 2-week seven-day recall (Booth, Owen, Baumen, et al., 1996) and Stage of Change (Marcus & Simkin, 1993). In addition, participants were categorized into ‘sufficient’ (meeting ACSM recommendations) or ‘insufficient’ (not meeting ACSM recommendations) activity. Sufficient activity was defined as accumulating at least 150 minutes of physical activity per week. Vigorous activities were multiplied by a factor of 2 to accommodate the reasoning that less minutes are recommended more vigorous activities than moderate activity. All recall was maxed at 14 hours/week. The study further divided the intervention group into two groups: Intervention Received (IR) and Intervention Received and Recalled (IR&R). Out of 215 intervention participants that were contacted at 4-6 weeks, 185 participants recalled receiving the booklets (IR group). Of the 185 participants who recalled receiving the brochures, 87% (n=161) reported receiving and reading the brochures (IR&R group). The results revealed that at 6-months the intervention group had significantly increased physical activity (p<.001), but the control group did not (p>.05). Forty-
five percent of intervention participants and 33% of the control participants met ACSM recommendations at 2-months and 40% of the intervention group and 31% of the control group met ACSM recommendations at 6 months. Participants who reported receiving and reading the stage-based booklets (IR&R) were 1.54 times more likely to progress at least one stage from baseline to 6-month follow-up, as compared to the control group. Participants in the IR group were 2.65 times more likely and participants in the IR&R group were 3.17 times more likely to meet ACSM recommendations at 2-month follow-up as compared to the control group. This study reveals that short term physical activity increases can be achieved by a low-cost, minimal contact mailed intervention. Participants who received and read material were more likely to achieve ACSM recommendations. 

Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams (1992) examined the use of stages of change model to design an exercise intervention for community adults. The sample included 610 adults aged 18 to 82 (average of was 41.8 ± 13.8; 77% were female). Measurements included stage of change, processes of change, self-efficacy, and seven-day recall (citations are not specifically matched to measurement). At baseline, stage was assessed by a one-question item. The results of the stage question reveal that 39% (n=236) were in Contemplation, 37% (n=229) were in Preparation, and 24% (n=145) were in Action at baseline. Based on their current stage, the participant was mailed one of three brochures. The Contemplation booklet entitled “What’s In It for You?”, focused on benefits of physical activity, social benefits of physical activity, and learning how to reward oneself. The Preparation booklet entitled “Ready for Action”, focused on benefits of physical activity, setting short and long term effects, rewards for activity, time management, and developing a walking program. The Action booklet entitled “Keeping it Going” focused on trouble shooting situations which may lead to exercise relapse, goal setting, reward for activity, avoiding injury, and cultivating exercise partners. The six-week intervention included written materials to encourage participants to initiate or increase activity, a resource manual describing activity options in the community, and weekly “fun walks” and “activity nights”. In addition, participants also received
either the Contemplation, Preparation, or Action brochure. At the conclusion of the six-week intervention, a stratified (by stage) random sample was selected (n=401, 33% of each stage). Of the 411 randomly selected participants, 236 completed the telephone interview. Telephone interviews were conducted over a three-week period on those participants who were randomly selected. The interview consisted of a series of brief questions related to exercise status, activities engaged in over past six weeks, and demographics. The calls averaged 12 minutes in length. The results conclude that participants significantly increased their physical activity after the six-week intervention (p<.0001). For the Individuals who were in the Contemplation stage at baseline, 31.4% advanced to Preparation. Sixty-one percent of participants who were at Preparation at baseline advanced to Action. Of those in the Action stage at baseline, 10% reported a relapse to a ‘lower’ stage. The study reveals that a stage-based mailed intervention can establish increases in physical activity. A limitation of the study is the short duration of the intervention and lack of long-term follow-up measures.

Two articles [Bock, Marcus, Pinto, & Forsyth (2001) and Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante (1998)] were published on the same study and therefore will be discussed together. The study compared the efficacy of two low-cost, mailed interventions designed to increase physical activity among adults. Healthy, sedentary (n=194) adults were recruited through newspaper advertisements. Sedentary was defined as failing to meet ACSM minimal physical activity rates (moderate physical activity for 30 minutes, 5 days/week). Measurements include: Motivational readiness (Marcus, Rossi, Selby, et al., 1992); Seven-day physical activity recall (Sallis, Haskell, Wood, et al., 1985); Decisional balance (Marcus, Rakowski, & Rossi, 1992); Self-Efficacy (Marcus, Selby, Niaura, & Rossi, 1992) and Processes of change (Marcus, Rossi, Selby, et al., 1992). Participants received small incentives (pens, key chains, etc) for questionnaires that were returned. In addition to the small incentives, all participants who returned a questionnaire were sent a check for $10. Of the 194 subjects recruited 150 completed all four assessments (baseline, one-month, three-month, & six month). Subjects were randomly assigned to either the Individually Tailored-
Intervention (IT) or the Standard Care Intervention (ST). Participants assigned to the Standard Care Intervention (ST) received four booklets from the American Heart Association (AHA) “Walking for a Healthy Heart”, “Exercise Diary”, “Swimming for a Healthy Heart”, and “Cycling for a Healthy Heart”. The order was randomly determined. The AHA booklets were similar in length as compared to the stage-based manuals. ST participants received one AHA booklet at baseline. At one-month and three-month the ST participant received the next AHA booklet. At six month, the ST participants were mailed the final AHA booklet (Marcus, Bock, Pinto, et al., 1998).

Participants in the Individually-Tailored Intervention (IT) received computer generated tailored reports and manual that matched (a) stage, (b) self-efficacy, (c) progress on minutes of physical activity since last assessment. At baseline and at one-month, participants received the individual computer generated report, a manual that matched their current stage, and a cover letter. At three months, participants were mailed a cover letter, the manual that matched their current stage, the next stage manual, and the individually tailored computer generated feedback. At six months, subjects were mailed a cover letter, the manual that matched their current stage and all other stage-based manuals, and the individually-tailored computer generated report. Repeated measure ANOVA and Chi-Square analysis were conducted to examine changes over time and difference between the IT and ST groups. Repeated measure ANOVA revealed that there was a significant improvement across time for both groups (p<.01). The IT group reported significantly greater minutes of physical activity as compared to the ST group at one-month (p<.01), three-month (p<.01) and 6 month (p<.01). At six-months, the ST group reported a mean of 97.6 minutes (sd=98.3) of physical activity, as compared to a mean of 151.4 minutes (sd=148.6) for the IT group. Chi-Square analysis revealed that a significantly greater number of participants in the IT group (43.6%) reached ACSM recommendations as compared to the ST group (18.1%)(p<.01)(Marcus, Bock, Pinto, et al., 1998). At the 6-month assessment, 42.3% of IT participants reached the Action stage as compared to 18.8% of the ST participants (p<.002). Participants in both groups
significantly increased self-efficacy from baseline to six-month (p<.001). Benefits of physical activity (pros on decisional balance) significantly increased from baseline to six-months for both groups (p<.05)(Marcus, Bock, Pinto, et al., 1998). Individuals who met ACSM recommendations reported significantly higher self-efficacy (p<.001), fewer barriers (p<.05), and endorsed more of the behavioral processes for change (p<.001)(Bock, Marcus, Pinto, Forsyth, 2001).

**Home-Based Physical Activity Summary:**

Group exercise and facilities may remain popular for people who enjoy the social aspects of such programs and are able to overcome barriers related to convenience. However, suggestions have been made that only a small percentage of the population enjoy going to the gym rather than exercise at home (Iverson, Fielding, Crow, & Christenson, 1985). Twenty-four articles (16 studies) were found that conducted a home-based program. See Appendix for Home-base table.

**Summary of Studies Comparing Exercise Regimens:**

There appears to be a pattern in the home-based literature concerning the relationship of ‘within group’ (structured vs. home-based) intensity of exercise regimen and adherence rates. Intensity of exercise regimen does not appear to impact adherence levels in home-based exercise groups. In the study by Gossard et al. (1986), the low intensity home-based group and the high-intensity home-based group did not display significant differences for adherence rates. King, Haskell, et al., (1991) conducted a study in older men and women and found no significant difference was found between the high-intensity home-based group and the low-intensity home-based group for one year exercise adherence. A similar finding was found in the in the study by King, Haskell, et al. (1995) in which low-intensity home-based adherence rates and high-intensity home-based adherence rates were not significantly different at year one. Garcia & King (1991) would also support that in their 12 month study, intensity rates within the home-based groups did not determine adherence rates.
Level of intensity regimen does appear to impact adherence levels in structured-exercise regimens. In the study by Cox et al. (2003), the moderate-intensity structured exercise regimen had no drop-outs throughout the 18-month study, whereas 18 participants dropped out of the vigorous-intensity structured exercise regimen.

Six studies were found that compared home-based regimen to a structured-exercise regimen. Five of the six studies found the home-based groups to have greater adherence than the structured exercise groups. Results from the Stanford Sunnyvale Health Improvement Project reveal that home-based groups had significantly higher adherence as compared to the structured exercise group at 6-months and at 12-months (p<.001) (King, Haskell, Taylor, DeBusk, 1991 and Oman & King, 1998) and at 24 months (King, Haskell, Young, Oka, Stefanick, 1995).

The Project Active studies [Dunn, Marcus, et al. (1997); Dunn, Garcia, et al. (1998); and Dunn, Marcus, Kampert, et al. (1999)] revealed that both groups significantly increased their physical activity over the 6-month intervention. At 12 months, the difference between the groups was non-significant with 39% of the lifestyle group and 35% of the structured group had an adherence of 70% or more. At the end of the second year, there was no difference between the groups (Dunn, Marcus, Kampert, et al., 1999).

Perri et al., (1997) also found that the home-based group reported more adherence than the structured group at one year. Andresen et al. (1999) also found higher adherence rates among the lifestyle-exercise group as compared to the structured exercise group. Garcia and King (1991) reported that the combined home-based groups reported greater adherence than the structured-group. It could be hypothesized that a sedentary adult may be more likely to adopt and adhere to a home-based regimen as compared to a structured-exercise regimen.

Combining both home-based groups and combining structured-groups and then comparing home versus structured groups revealed that the structured groups had higher adherence rates (n=52) versus the home-based groups (n=38) at the 18 month period, though not significant. The only significance was found at the 6-month period, in which the structured-exercise regimen groups displayed higher adherence that the home-based exercise regimens. However, it should be noted that this study is the only study that utilizes a low/moderate structured exercise group. No subject in the low/moderate structured exercise group dropped from the study (18 dropped from the high-intensity structured, 23 dropped from the moderate-intensity home-based, and 24 dropped from the high-intensity home-based group). The authors speculate that the low/moderate structure group may be influencing the structured group results. Again, since the low and high intensity regimens were not separated out, one cannot determine if it is indeed the low/moderate structured group that is causing the difference. A severe limitation of the study is that the low-intensity and high-intensity structured groups were collapsed into one group “structured group” and the low-intensity and high-intensity home-based groups are collapsed “home-based group”. So from the article, one cannot determine the relationship between location (home vs. structured) and intensity (high vs. low).

Analysis of Studies Comparing Exercise Regimens:

Of the studies that compare exercise regimens, there is somewhat of a lack of consistency of what is defined as “low” and “high” intensity. Low-intensity” is described by Cox et al. (2003) as 40-55% of THR. This intensity is low compared to other studies. Perri et al. (1997) and Gossard et al. (1986) define “Low-intensity” as 60-72% of THR. Similarly, the Stanford Sunnyvale studies define “low-intensity” as 60-73% of THR (King, Haskell, et al., 1991). “High-intensity” is described by Cox et al. (2003) as 65-80% of THR. The 65% is a low intensity for a “high” intensity exercise regimen as compared to other studies. Gossard et al. (1986) defines “high-intensity” as 75-87% of THR. The Stanford Sunnvale studies define
“high-intensity” as 73-88% of THR (King, Haskell, et al., 1991). The intensity prescribed may impact adherence rates. It may be possible that if a lower-intensity is prescribed, greater the adherence may be reported. This is seen in the Gossard et al. (1986) study that reports that adherence for the low-intensity and high-intensity groups were over 90% at weeks 6 and 12.

One has to consider the short duration of the study when comparing adherence rates. It seems logical that longer studies (6 months or more) may have lower adherence rates. The Cox study reports that at 6 months 83% of the combined structured groups and 63% of the combined home-based groups adhered to the specified regimen (p<.001). At 18 months, adherence dropped to 65% for structured groups and 50% for home-based groups. The Stanford Sunnvale studies (King, Haskell, Young, et al. 1995; and King, Haskell, Taylor, et al., 1991) would also support that length of study impact adherence rates. At the end of year one, 78% of high-intensity home-based, 75% of low-intensity home-based, and 52% of structured based participants adhered to their specific exercise regimen. At the end of year two, the rates drop to 67% high-intensity home-based, 49% low-intensity home-based, and 36% of structured group participants adhered to their specific exercise regimens. Project Active studies further support the idea that length of study impacts adherence rates. After 6-months, 78% of the lifestyle group and 85% of structured group met ACSM recommendations (Dunn, Marcus, Kampert, et al. 1997). At 24-months, 39% of lifestyle group and 35% of structured group adhered to the ACSM recommendations at least 70% of the time (Dunn, Marcus, Kampert, Garcia, et al., 1999).

Among the studies that compare exercise regimens, there is a lack of comparison of two (or more) “equal” exercise regimens. Three studies that compare exercise regimens prescribed the same exercise regimen to the structured group and the home-based group. (Cox et al., 2003; Perri et al., 1997; and the Stanford Sunnvale studies (King, Haskell, et al., 1995). Of the three studies that prescribed equivalent exercise regimens, two studies found that the home-based group had significantly greater adherence as compared to the structured group (Perri et al., 1997; and the Stanford Sunnvale studies (King, Haskell, et al., 1995).
In the Cox et al. (2003) study, the low-intensity groups (structured and home) were to exercise 40-55% of THR, 3X/week and the high-intensity groups (structured and home) were to exercise 65-80% 3X/week. A limitation of the study is that for analysis, groups are combined by location. So one cannot determine the relationship between intensity (low vs high) and group (home vs. structured) combined.

In the Perri et al. (1997), participants were randomly assigned to either a home-based or a structured exercise regimen. All participants were instructed to exercise 60-70% of THR, 5 days/week for 30 minutes. At 6-months, the home-based group had marginally significant greater adherence than the structured group (p<.06). At 12-months, home-based participants had greater adherence than the structured-based group (p<.04). The strengths of this study include that both structured and home-based groups were prescribed the same exercise regimen. At 6 months there is a marginal difference between groups (p<.06), but one-year there is a significant difference between groups (p<.04). Since both groups were prescribed the same exercise regimen, this study would support that a home-based exercise regimen can impact physical activity rates. This study would also support that duration of follow-up procedures impacts whether between the structured group and home-based group are found.

The Stanford Sunnvale participants were randomly assigned to: low-intensity home-based, high-intensity home-based, or high-intensity structured. The low-intensity home-based was to exercise 60-73% of THR 5 days/week for 30 minutes. Both the high-intensity home-based and high-intensity structured groups were to exercise 73-88% of THR, 3 days/week for 60 minutes. The structured exercise group was to attend 3 group-based sessions per week. The majority of endurance activities included walking and/or jogging with some use of stationary bikes and treadmills. At one year, the high-intensity home-based had the highest adherence (78%), followed by the low-intensity home-based (75%), and lastly the structured exercise group (52%). The difference between home-based groups combined and the structured exercise group was significant (p<.0005). The strength of the study is that both high-intensity groups received the same exercise regimen. Thus this study would support that
a home-based exercise regimen can impact physical activity rates. The limitation of the study is that there is not a low-intensity structured group. In the Cox et al. (2003) study no subject in the low/moderate structured exercise group dropped from the study.

As stated before, many studies compare groups that were not prescribed the same exercise regimen. Three studies that compared exercise regimens did not prescribe equivalent exercise regimens to the structured group and the home-based group (Andersen, et al., 1999; Opdenacker et al., 2008; and Project Active studies (Kohl, Dunn, Marcus, and Blair, 1998)).

In the Andersen et al. (1999) study, subjects were randomly assigned to structured exercise group or a home-based group. This structured exercise group was to attend three step aerobic sessions per week (7-8.5 Mets) and the home-based program was to accumulate 30 minutes of physical activity on most if not all days of the week. The analysis presented reports primarily health outcomes (high blood pressure, cholesterol, weight loss) and very little on physical activity measures. The authors state that at one-year follow-up, 55% of lifestyle participants and 48% of structured participants reported engaging in regular moderate activity (significance is not given). A limitation of the study is that the two groups were not given an equal exercise regimen. Participants in the structured exercise regimen were required to attend three step aerobic sessions while the home-based group was required to accumulate 30 minutes of moderate physical activity. It seems logical that more barriers would exist with the structured exercise regimen. Subjects in the structure group are required to exert more aerobic effort. Plus exercise preferences are not accommodated in the structured exercise regimen. Structured group participants are not given a choice of mode of exercise. A step aerobic class was the designated form of exercise, thus if one did not like step aerobics, one would less incline to adhere.

The Opdenacker et al. (2008) study consisted of 120 volunteers that were randomly assigned to the “structured exercise” group of to the “home-based” group. The structured exercise group was to attend 3 weekly aerobic sessions lasting 60-90 minutes. The study
does not report a specific exercise regimen for the home-based group. The articles states that home-based participants “were to integrate physical activity into their lives” and that participants “received an exercise program based on needs, preferences, and experience”. The study concludes that home-based group had higher levels of physical activity as compared to the structured exercise group (p<.05). Since the home-based group was not given a specific exercise regimen, comparison between the two groups is extremely limited. The article discusses adherence rates, but again, since the home-based exercise regimen is not given, one cannot determine what exercise regimen the home-based group is adhering to.

In addition the two groups were not given equivalent exercise regimens. The structured group was required to attend 3 weekly aerobic session lasting 60-90 minutes, while the home-based group was to “accumulate moderate activity”. As stated before, it seems logical that more effort would be needed to attend three 60-90 minute aerobic sessions per week than to accumulate 30 minutes of moderate activity.

Project Active participants were randomly assigned to a structured exercise regimen of a lifestyle home-based regimen. Structured exercise participants were to exercise 50-85% of max aerobic power, 20-60 minutes, initially asked to attend 3 session per week and then to progress to 5 session per week. After 3 weeks of supervised activity, participants were free to choose any activity. A limitation of this exercise regimen is that it is broad. It may be that the intention was to have a broad prescribed exercise regimen so that moderate activity and vigorous activity would be captured. However, if the exercise regimen is not clearly defined one could have a participant who engages in exercise of 50% of their THR, 3 days per week, for 20 minutes. Thus this individual would be “adhering” to the exercise program, but not meeting any ACSM recommendations.

Lifestyle participants of Project Active were to accumulate 30 minutes of moderate activity on most, preferably all days of the week. At 6-months and at 24-months there is no difference between the groups for those achieving ACSM recommendations (p>.05). All four articles cite ACSM 1990 recommendations for the structured group, but define the lifestyle
group as “asked to achieve equivalent of the ACSM recommendations for moderate activity (Kohl, et al., 1998)” or “accumulate 30 minutes of moderate activity on most, preferably all days of the weeks” (Dunn, Marcus, et al., 1997). The lifestyle home-based group’s exercise regimen definition does not specifically instruct participants to engage in physical activity a certain amount of days per week. The instructions of “on most, preferably all days of the week” is vague. Of the four studies published on Project Active, none of them specify how much or how many days of moderate activity is needed to be considered “meeting ACSM recommendations”. Perhaps if Project Active would have clearly defined the moderate activity regimen, participants would have had a clearly goal or expectation of how much/how many days of moderate activity to engage in, thus differences between the groups may have been found.

Three studies that compared exercise regimens did not prescribe equivalent exercise regimens to the structured group and the home-based group (Andersen, et al., 1999; Opdenacker et al., 2008; and Project Active studies (Kohl, Dunn, Marcus, and Blair, 1998)). The problem of having the structured group prescribed one exercise regimen while having the home-based group prescribed a different exercise regimen is that the results can be confounded. Are the home-based groups reporting more adherence because of the home-based exercise regimen or because the exercise regimen prescribed is easier to achieve? In two of the studies (Andersen, et al., 1999; Opdenacker et al., 2008), it appears the structured exercise group was required to exert more aerobic force (higher intensity) and to engage in exercise for a longer duration of time, whereas the home-based group was to accumulate 30 minutes of moderate activity. It seems logical that intensity and duration of exercise regimen would impact adherence rates.
**Analysis of Implementation Strategies:**

To recall, implementation strategy studies implement a implementation strategy such as telephone and mailings. The literature reveals that home-based interventions use phone calls as a method of implementation and as a method for feedback and communication. Of the studies categorized as “Comparison of Exercise Regimens” (n=7), five studies use the telephone as a method for program implementation. These studies do not report phone calls as a measured variable, but as a part of the implementation of the home-based groups. Since it was not a measured variable, little detail about the phone calls was given. In general, participants were called weekly or biweekly. The purpose of the phone calls was to assess physical activity and to answer questions. Of the studies categorized as “Implementation Strategy” (n=11), four used telephone calls as one of the comparison strategy (call vs. no-call, call+mail vs mail-only). Castro, King & Brassington (2001) conducted the second year study for the Stanford Sunnyvale Health Improvement Project. “Mail-only” participants had significantly greater adherence than “mail + telephone” participants. However, it should be noted that during the first year of the study, all home-based participants had received weekly (weeks 1-4), then biweekly (weeks 8-12), then monthly phone calls for the first year. The authors stated that since all participants in this particular study had already received phone calls for the first year, perhaps the calls made during the second year did not add value. Two studies (King, Taylor, Haskell, & DeBusk, 1988 and Nies, Chruscial, Hepworth, 2003) compared a group who received phone prompts and a condition that did not receive phone prompts. King, Taylor, Haskell, DeBusk (1988) revealed that at the end of 6-months higher adherence was found with the group that received the phone prompts. Nies, Chuscial, Hepworth (2003) subjects received 16 phone calls over the course of 24 weeks. The group who received the phone prompts reported more improvement in walking as compared to the control group. In King et al. (1988) the group who did not receive phone prompts still received a minimal intervention whereas in the Nies et al. (2003) study the control group did not received phone prompts or any type of intervention. It seems logical that a group who
receives an intervention reports more adherence than a group who receives nothing. Heesch, Masse, Dunn, Frankowski, & Mullen (2003) compare a class-room based intervention versus a mail+phone intervention. This study does not separate the “mail” portion and the “phone” portion, thus it will be further discussed with the mailed intervention discussion.

Seven studies used mail/print as a strategy for program implementation (Heesch, Masse, Dunn, Frankowski, & Mullen, 2003; Humpel, Marshall, Iverson, Leslie & Owen, 2004; Ley & Cardinal, 2004; Marshall, Bauman, et al., 2003; Bock, Marcus, Pinto, & Forsth, 2001; Marcus, Bock, Pinto, et al., 1998). Both groups received the same intervention in the Heesch, Masse, Dunn, Frankowski, & Mullen (2003) study. One group received the intervention through a class-room based intervention and the other group received a home-based intervention via mail + phone. The home-based group reported greater adherence to the exercise regimen as compared to the classroom-based group. The study by Humpel, Marshall, Iverson, Leslie & Owen (2004) compared a “print-only” group with a “print + phone” group. Both groups received the same print material over the course of three weeks. In addition, the “print+phone” group received three weekly phone calls. In this study, no difference between the groups was found on any of the walking measurements (p<.05). Levy & Cardinal (2004) randomly assigned subjects to one of three groups: control, intervention, or intervention + booster. The "intervention" group and the “intervention + booster” group received the same mailed intervention. In addition, the booster group received a postcard after one month. A 3X3 repeated measure ANOVA revealed a non-significant interaction or group effect (p<.05).

Four articles (3 studies) used a mailed print intervention that utilized stages of change. In all three studies, the print material was developed based on TTM/Stages of Change constructs (Marshall, Bauman, Owen, Booth, Crawford, & Marcus, 2003; Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams, 1992) and (Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante, 1998; Bock, Marcus, Pinto, Forsyth, 2001). The Marshall et al. (2003) study and the Marcus, Banspach, et al. (1992) study compared an intervention group that
received four stage-based manuals and a control group that received no intervention. Both studies revealed that the intervention group that received the stage-based material significantly increased their physical activity as compared to the control group. One study compared a group that received stage-based manuals and a group that received “standard care” (Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante, 1998; Bock, Marcus, Pinto, Forsyth, 2001). The standard care group received educational material (four brochures) from the American Heart Association. The study revealed that subjects who received the stage-based material were more likely to achieve ACSM recommendation at 6-month and at 12-month follow-up.

Of the studies categorized as “Comparison of Exercise Regimens” (n=6), three of the six incorporated some type of behavioral strategy as part of the implementation (Opdenacker, Boen, Coorevits, and Deleclus, 2008; the Stanford Sunnyvale Studies and the Project Active studies). The common theme is those three studies is that the home-group is the one receiving the behavioral strategies. It does not appear that the structured-exercise group received any behavioral strategies during program implementation. Subjects who were assigned to the structured exercise group in Project Active did receive five stage-based manuals, but after the intervention ended (at the end of the 6 months). In those three studies, the comparison is more than just between structured vs home-based physical activity. It seems that one is comparing not just rates of physical activity because one group (the home-based group) is receiving some type of behavioral strategy while the other group (the structured group) is not. In those cases, the comparison is more between a home-based intervention versus the traditional gym membership prescription.

There were 2 studies that had a longer follow-up period that last two years – the Stanford Sunnyvale Health Improvement Project and Project Active. The Stanford Sunnyvale participants were randomly assigned to an: assessment-only group, high-intensity structure group, high-intensity home-based group or the low intensity home-based group. Both home-based groups received phone calls for the first four weeks, biweekly for the next four weeks
and then monthly for the remainder of the year. Project Active participants were randomly assigned to structured exercise regimen or home-based exercise regimen. Project Active participants received a six month intervention, followed by 18-months of maintenance. Home-based participants were encouraged to perform physical activity that could be conducted at the home. However, the home-based participants met in a group setting weekly for the first 16 weeks and then biweekly until week 24. The Stanford Sunnyvale intervention is longer in duration (one year) as compared to Project Active (6 months). However, the Project Active home-based intervention appears to be more intensive (20 group meetings over 6 months). In the Stanford Sunnyvale study, participants received 10 phone calls over 12 months. Ironically, it was the Stanford Sunnyvale study that illustrated significant differences for measures of physical activity between the home-based group and the structured group at 6 months, 12 months, and 24 months. Whereas, Project Active revealed no significant differences between the groups for measures of physical activity at 6 months, 12 months, and 24 months.

Studies that were classified as “Implementation Strategy” varied in length with one study lasting six weeks and other studies lasting up to 6-12 months. Most “implementation strategy” studies lasted six months (n=5). There is limited support for greater lengths of intervention for the “implementation strategy” studies. The studies that reported shorter lengths of interventions (less than 6 months) (Levy & Cardinal, 2004; Humpel, et al., 2004) reported no differences between the intervention group and the comparison group. The studies that had a longer intervention (6 months or longer) (Castro, et al., 2001; Heesch, et al., 2003; Nies, et al., 2003; Bock, Marcus, et al., 2001) were more likely to report a significant difference between the intervention group and the comparison group. Of the “Implementation Strategy” studies, printed mailings were the most common method for home-based implementation (n=7 studies). Except for two studies, in which participants were contacted primarily by phone, phone calls were usually implemented as part of a print mailing implementation strategy or were a part of the home-based exercise regimen. For the studies that compared implementation strategies (phone vs. phone + mailings; SOC manuals vs. AHA...
manuals) there is little support to show that one method is superior then another method. In those studies that compared implementation strategies, both groups reported an increase in physical activity measures.

Lack of theory in implementation and in measurements is a problem among the home-based literature. Eight of the 16 studies describe the use of theory. Wilbur (2003) reports the use of the Cox interaction model of client behavior as the basis for the intervention. Levy & Cardinal (2004) report use of the Self-Determinism Theory. Project Active states that the intervention is based on Social Cognitive Theory (SCT) and Transtheoretical Model (TTM). Only one of the four published Project Active studies, report on these constructs. Studies from the Stanford Sunnyvale do not report use of specific theory or model. The article by Garcia & King (1991) describes self-motivation index and self-efficacy. Four studies specifically state that the intervention is based on TTM and Stage of Change (SOC) Model. Of those four studies, two (Marshall, Bauman, et al., 2003 and Marcus, Banspach, et al., 1992) studies used SOC to develop stage-based manuals, but do not actually measure SOC in their intervention. Cox et al. (2003) states that the intervention is based on SOC. In that study, participants received appropriate stage-based manuals periodically during the course of the 12 month study. Stage of change is assessed at baseline, 6 months, 12 months, and 18 months. Marcus, Bock, et al. (1998) report that their intervention is based on TTM and SOC. In this study participants received appropriate stage-based manuals and concepts from SOC and TTM are measured at three months and six months.

Of the 16 home-based studies found, three studies used “behavioral strategies” and five reported measuring theoretical constructs. The most commonly measured theoretical construct was self-efficacy. Three studies report using “Behavioral Strategies” (Opdenacker, Boen, Coorevits, & Deleclus, 2008; King, Taylor, Haskell, DeBusk, 1988, Heesch, Masse, Dunn, Frankowski, Mullen, 2003). In those three studies, the “behavioral strategies” are not specifically measured.
Five studies measured self-efficacy. All studies, but one (Nies et al., 2003) found self-efficacy to be significant. Of the five studies, effect sizes could be calculated for two studies (Wilbur, et al., 2003 and Marcus, Bock et al., 1998). Both studies revealed a small effect size for self-efficacy. The Stanford Sunnyvale Health Improvement Project studies reveal that self-efficacy was a significant predictor of exercise adherence at 6 months and at 12 months, but not at 24 months (Oman and King, 1998). Self-efficacy was a significant predictor of adherence among the home-based conditions. Self-efficacy produced little change in the means within the structured group at any time frame. In the study by Garcia & King (1991) the results indicate that self-efficacy was a significant predictor at 6 months and at 12 months. However, self-motivation was not a significant predictor at any of the time frames. Since the authors combined the groups, no comparison can be made about the relationship of self-efficacy and self-motivation between the structured vs. home-based groups. Project Active (Dunn, et al., 1997) revealed that self-efficacy was a significant predictor of 6 month physical activity for both structured and home-based participants. Wilbur et al., (2003) revealed self-efficacy was a significant predictor of physical activity at 24 weeks. Nies, Chrusckail, Hepworth (2003) did not find self-efficacy to be a significant predictor of physical activity (p>.05). Marcus, Bock, Pinto, Forsyth, et al. (1998) found self-efficacy increased significantly from baseline to 6 months for both the Individually tailored group and the standard care group.

Type of implementation (phone vs mailing) does not appear to impact whether self-efficacy will be significant predictor of physical activity or not. Self-efficacy was significant predictor of 6 month and 12 month adherence for the phone-based Stanford Sunnyvale intervention (Oman & King, 1998 and Garcia & King, 1991). Self-efficacy was a significant predictor for both the structured group and home-based group for Project Active. Home-based subjects in Project Active attend 16 weekly classes (in a group setting). The studies by Bock, Marcus, et al. (2001) and Marcus, Bock et al. (1998) used stage-based mailings and found self-efficacy to be a significant predictor of for 6 month and 12-month adherence.
In conclusion, the home-based literature supports that a minimal contact intervention, in which subjects are to exercise in their home or neighborhood, is capable of impacting rates of physical activity in adults. Use of a standard care group (that received AHA material) has been shown to be an acceptable comparison group (Levy & Cardinal, 2004 and Marcus, Bock, Pinto, et al., 1998). Few home-based studies (n=5) measure theoretical constructs. Self-efficacy (a SCT construct) has been measured in home-based literature, but has been shown to have a small effect size. Stage of Change and Transtheoretical Model are the most commonly used “theories” in home-based literature. To date, no home-based intervention has been based on the SCT. The present study meets a need and adds to the home-based literature. The present home-based study is based on constructs from the Social Cognitive Theory (self-efficacy, social support, and self-regulation) that have had little if any exposure in home-based study. A new strategy for implementation was conducted. Mailings are a common implementation strategy in the current literature. In the present study, participants received direct door-to-door services. To date, no home-based intervention has delivered and pick-up material in person.

Studies Utilize the American Heart Association’s Educational Brochures as a Comparative Intervention

The purpose of this section was to examine studies that compare a stage of change-based program to a standard program. Six studies were examined in this section. All six studies compare a stage of change matched/tailored intervention against either a standard group or a comparison group. One study was unique in that it compared a lifestyle stage-based intervention, a structured exercise stage-based intervention, and a fitness-only group (Cardinal & Sachs, 1995). The study by Peterson and Aldana (1999) was the only study that compared a stage-based group to a group that received information from Surgeon General’
Report. Four studies compared a stage-based group to a comparison group that received American Heart Association brochures (Marcus, Emmons, et al., 1998; Marcus, Bock, et al. 1998; Bock, Marcus, et al., 1998; and Blissmer & McAuley, 2002).

Peterson & Aldana (1999) conducted a study on employees of a large telecommunication company. The purpose of the study was to evaluate the effect of a stage-based exercise intervention in working adults. Subjects were randomly assigned to one of three groups: a stage-based intervention group (n=174), generic intervention group (n=168), and a control group (n=185). Each program was 6 weeks long. Individuals in the stage-based intervention received a two-page written message tailored to their individual stage of change. Individuals in the generic group received non-tailored materials based on information from the Surgeon’s General Report on physical activity. Individuals in the control group did not receive any materials. Stage of change was measured using a valid and reliable instrument (Marcus, Banspach, Lefebvre, et al., 1992). Analysis of variance was conducted. There was a significant difference between the groups (p>.05). The stage-based message group demonstrated a 13% increase in activity; the generic message increased 1%; and the control group experienced an 8% decrease over the 6-week period. Comparing stage progression and groups it is revealed that of the tailored message group, 59.8% of subjects remained in the same stage, 33.3% progressed in the direction of maintenance and 6.9% regressed at least stage toward precontemplation. In the generic message group, 65.7% of the individuals remained the same, 18.9% progressed at least one stage and 15.4% regressed to an earlier stage. Individuals in the control group revealed that 69.2% of subjects remained in the same stage, 14.1% progressed to the next stage, and 16.8% regressed to an earlier stage. Subjects in all three groups were asked if they read the material given to them. The results conclude that 92.5% of those in the stage-matched group and 79.3% of the generic group reported reading the material that was given to them [Chisquare=12.44, df=1, p<.01]. The authors conclude that stage-matched intervention produced greater rates of physical activity as
compared to the Surgeon General’s Report group, over the course of the study (Peterson & Aldana, 1999).

Cardinal & Sachs (1995) conducted a study on 130 healthy women employed full-time in a clerical occupation. The sample consisted of 63% African American, 27% Caucasian, 9% Latino, and 1% Native American women. Eighteen percent of the subjects graduated from high school, 23% from college, and 7% from graduate school. Study participants were stratified by baseline stage of change and then randomly assigned to receive one of three mail-delivered, self-instructional written exercise packets. The Lifestyle Exercise Packet (LEP) encourages subjects to integrate a more active lifestyle (such as taking the stairs instead of the elevator). The packet consisted of 7 pages of material written at the 8th grade level. The packet consisted of stage-specific behavioral and cognitive activities. The Structured Exercise Packet (SEP) was identical to the LEP in terms of length, readability, and cognitive and behavioral stage of exercise activities. However individual were recommended to exercise at prescribed exercise intensity according the American College of Sports Medicine 1991 recommendations. The Fitness Feedback Packet (FFP:control packet) informed subjects of their health status, predicted body fat, and predicted VO2max only. This was 2 pages long and written at the 9th grade level. Stage of change was assessed using Cardinals’ five-item scale (Cardinal, 1995). Status of drop outs was not significantly different between groups ($\chi^2=3.44, df=2, p>.10$). The results revealed that the LEP group ($\chi^2=2.85, p>.24$), the SEP group ($\chi^2=.90, p>.64$), and the FFP group ($\chi^2=4.02, p>.13$), did not significantly improved their stage of change status from baseline to 1 month or from baseline to 7 months. However, overall (all groups combined) there was a significant increase from baseline to 1 month and to 7 month ($\chi^2=6.08, p<.03$). This study compared a lifestyle approach to a structured exercise approach and a fitness-only approach. Neither method produced significant stage of change status. This study suggests that type of exercise regimen recommended does not determine stage of change status (Cardinal & Sachs, 1995).
Marcus, Emmons, Simkin-Silverman, Linnan, Taylor, Bock, Roberts, Rossi, and Abrams (1998) conducted a worksite study. The purpose of the study was to compare the efficacy of a self-help intervention tailored to the individual’s stage of change with a standard self-help exercise promotion intervention. This study compared the efficacy of two self-help physical activity interventions delivered at the worksite. The first program was the motivationally tailored program. The second program consisted of a standard physical activity promotion material. Printed materials were given to subjects at baseline and again at 1 month later. Assessments of stage of change and physical activity were measured at baseline and 3 months. Participants in this study were drawn for 11 worksites participating in the Working Healthy Project. This study focuses on the ‘Jump Start to Health’ part of the Working Healthy Project. The sample consisted of 1120 employees. The average age was 39 years and 43% of the sample was female. Physical activity assessment included exercise motivational stage exercise (Marcus, Rossi, Selby, et al., 1992) and frequency and duration of physical activity behavior (Blair, 1984). Pretest and posttest measurements were conducted on company time and took about 15 minutes to complete. The motivationally tailored intervention consisted of 5 stage-tailored self-help manuals that were based on previous literature (Marcus, Banspach, Lefebrve, et al., 1992). Individuals in the precontemplation stage received the manual “Do I Need This?” This manual focused on increasing awareness of benefits of activity. Individuals in the in the contemplation stage received the manual “Try It You’ll Like It”. It focused on reasons to be physically active, learning to reward oneself, setting realistic goals, and social support. Individuals in the preparation stage received the manual “I’m On My Way.” This manual reviewed the benefits of physical activity, goal setting, tips on safe and enjoyable activities, and addressing obstacles. Individuals in the action stage received the manual “Keeping It Going”. This manual focused on staying motivated, rewarding oneself, enhancing confidence, and overcoming obstacles. Individuals in the maintenance stage received the manual “I Won’t Stop Now” manual. This manual focused on avoiding injury, goal setting, varying activities, rewarding oneself, and planning ahead to stay active. After one month, the
individuals in each stage were mailed the next stage manual. Following the 3 month assessment, all subjects were mailed all the stage-based manuals. A letter was sent to each participant directing them to the manual that was most likely to be their next stage manual.

The standard intervention consisted of five manuals from the American Heart Association (AHA). The order of these manuals was randomly picked. The order of the manuals were: Walking for a Healthy Heart, Swimming for a Healthy Heart, Cycling for a Healthy Heart, Dancing for a Healthy Heart, and Running for a Healthy Heart. At the same time the intervention group received their stage-based manuals, the standard group received the first AHA manual. After one month, the standard group received the second AHA manual. After the 3 month assessment, all standard groups received the remaining AHA manuals. A repeated measure MANOVA was performed to determine differences between the group and between time frames. Chi-Square analysis was used to determine the relative efficacy of the interventions in enhancing motivational readiness for exercise adoption. The analysis revealed that more subjects in the motivationally tailored condition demonstrated stage progression (37% for stage-tailored, 27% for standard). Stage progression is defined as an increase of one or more stages, by the 3-month post-assessment. More subjects in the standard group displayed stage stability (58% stage-tailored, 52% standard) or stage regression (15% for stage-tailored, 11% standard; \( \chi^2 = 11.17, p < .01 \)). Results of the MANOVA showed that stage movement was significantly associated with changes in minutes of self-reported exercise per week (\( F(2,887) = 18.6, p < .001 \)). However, there was no differences based on treatment assignment alone (stage versus standard) for exercise participation. However, a significant difference was detected between treatment assignments in changes in physical activity between baseline and post based on treatment assignment (\( F(2,887) = 29.1, p < .05 \)), indicating that the effect of treatment assignment on physical activity was influenced by both stage at baseline and stage movement. The authors conclude that the stage-tailored group resulted in greater stage progression as compared to the standard group (Marcus, Emmons, et al., 1998).
Marucs, Bock, et al., (1998) conducted a community study. The purpose of the study was to evaluate whether the individualized intervention plus motivationally-matched self-help manuals would enhance physical activity participation among sedentary individuals, as compared to standard self-help materials. The subjects for this study included 149 healthy, sedentary women and men who were recruited via newspaper advertisements. Sedentary was defined as ‘failing to meet CDC/ACSM criteria for minimum physical activity participation (participation of moderate physical activity at least five days per week for a total of 30 minutes a day)’. Subjects were screen by telephone. Subjects were mailed consent forms and forms for physicians to sign. The forms were be mailed by to the researcher. Subjects agreed to be randomly assigned to either the individually-tailored or the standard treatment condition. Exclusion criteria included: coronary heart disease, alcoholism, substance abuse, orthopedic problems, under age of 18, and current or planned pregnancy. Of the 194 subjects, 150 subjects completed all four assessments (baseline, one-month, three-month, and six-month assessment). Measurement included motivational readiness for physical activity (Marcus, Rossi, Selby, Niaura, Abrams, 1992), physical activity participation by self-day recall (Sallis, Haskell, Wood, et al., 1985), decisional balance (Marcus, Rakowski, & Rossi, 1992), self-efficacy (Marcus, Selby, Niaura, & Rossi, 1992), and behavioral and cognitive processes of change (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). The ‘Individually-Tailored Intervention’ consisted of computer generated reports and self-help manuals which were matched to the participants stage of motivational readiness for physical activity adoption. The ‘Standard Intervention” group consisted of four self-help brochures from the American Heart Association. The order of the booklets was randomly determined: Walking for Healthy Heart, Exercise Diary, Swimming for a Healthy Heart, and Cycling for a Healthy Heart. Subjects were mailed questionnaires to assess current stage of motivational readiness for physical activity adoption, self-efficacy, decisional balance, use of cognitive and behavioral process of change, and the time spent in physical activity. Subjects were asked to complete assessments and to return them by mail at each measurement time (baseline, one-month, three-month, and six-
month). Those who did not return a questionnaire within seven days were contacted by phone. To increase subject response rates, a small incentive (ie. pens, pencils, key chains) were included in each questionnaire. In addition, all subjects received a thank-you letter and a check for $10. Since subjects were required to be sedentary, only pre-contemplation, contemplation, or preparation were stage-tailored. At baseline and one-month subjects were mailed a stage-matched manual and a computer generated report. At three months, subjects were mailed a cover letter, a manual that matched their current stage, a manual that matched their next stage, and computer-generated feedback. At six months, subjects were mailed computer-generated feedback and all remaining stage-tailored manuals. Subjects in the standard condition received the first AHA manual. At one-month and three-month, subject in the standard condition received the next AHA brochures. At six months, standard condition received all remaining AHA brochures. Repeated measured ANOVA and Chi-Square analysis were conducted to examine changes over time and differences between the stage-tailored group and standard group. At baseline, participants in the standard group reported significantly more physical activity (mean of 20 minutes, SD=57.3) versus than the stage-tailored intervention group (mean of 5.5 minutes, SD=14.7) (p<.01). At the six month time period, there was a significant improvement in physical activity for both groups. At six months, the standard group reported a mean a 97.6 (SD=98.3) minutes for physical activity, while the stage-tailored group reported a mean of 151.4 (SD=148.6) minutes for physical activity [F(1,148)=172.68, p<.01]. It should be noted that at baseline the standard group reported more minutes of activity. This indicates that the stage-based group increase there activity to a greater extent than the standard group. Chi-square analysis was conducted to determine significance of person meeting the CDC/ACSM criteria. A significantly greater number of subjects in the staged-tailored group reached the CDC/ACSM criteria by the end of the six months (43% for stage-tailored group, 18.1% in the standard group)[X2 [1] = 11.3, p<.01]. Repeated measure ANOVA’s were conducted to determine changes in self-efficacy, cognitive and behavioral constructs. The results indicate that individuals in both the stage-tailored
program and standard program significantly increased in self-efficacy for physical activity \((F[3,146] = 6.1, p<.001)\) between baseline and six months. The pros (perceived benefits) of physical activity significantly increased from baseline to six months for both groups \((F[3,146] = 2.8, p<.05)\). Cognitive processes increased for both groups from baseline to the 3 month period \((F[3,145] = 3.1, p<.05)\). The authors concluded the program that utilized brochures from the American Heart Association were effective in increasing physical activity, with 18% of the AHA participants reaching the CDC/ACSM recommendations. A stage-tailored intervention was significantly better at increasing physical activity participation, with 43% of the stage-tailored participants reached the CDC/ACSM recommendations (Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante, 1998).

Bock, Marcus, Pinto, & Forsyth (2001) published a second article based on the Marcus, Bock, Pinto, et al. (1998) article. The primary outcome of this study was physical activity maintenance using data from participants who completed both 6-month and 12-month assessment \((n=120)\). Individuals were grouped according to whether they met the moderate or vigorous activity recommendations at 6 months or at 12 months. This created four maintenance groups. ANOVA showed that at the end of the study's intervention phase (6 months) the stage-tailored group reported significantly more minutes \((F[1,118]=8.03, p<.01)\) of physical activity per week (mean= 145 minutes \(\pm 146.2\)) versus the American Heart Association standard group (mean= 102 minutes \(\pm 98.3\)). At 12 months, the stage-tailored group reported more minutes per week (mean=187 minutes \(\pm 216.1\)) than the AHA standard group (mean=133 minutes \(\pm 216.8\)). The difference at 12 months was not significant \((p=.10)\). A chi-square analysis showed that participants in the stage-based tailored group (45%) were more likely to meet CDC/ACSM recommendations than the AHA standard group (18%) at 6 month \((\text{Chi-square}[1,120] = 6.9, p<.01)\). At 12 months, 42% of stage-tailored participants met CDC/ACSM recommendation, while 25% of the AHA standard care participants \((\text{Chi-square}[1,120] = 3.9, p<.05)\). An overall MANOVA (both groups combined) at 12 months, showed significant difference in psychological variables between those meeting the recommendations.
and those not meeting the recommendations \[F (8,110) = 4.09, p<.001\]. A post-hoc analysis showed individuals who met CDC/ACSM recommendations reported significantly higher self-efficacy \[F (1,118) = 14.8, p<.001\]; reported fewer barriers \[F (1,118)=4.9, p<.05\], and had higher processes of change \[F(1,118)=17.2, p<.001\], as compared to those who did not achieve the physical activity recommendations. A repeated measure ANOVA was conducted to examine how psychological variables changed between baseline and Month 12. The results indicate the self-efficacy \[F(2,226)=7.5, p<.001\] and behavioral processes of change \[F(2,226)=37.4, p<.001\] increased over the 12 month period. No differences between the groups were found at 12 months. Among those participants who had achieved CDC/ACSM criteria at 6 months \(n=38\), 55% continued to maintain their physical activity, while 44% regressed to below the physical activity criteria. The majority of the participants who were did not meet the physical activity recommendations at 6 months remained under the physical activity recommendations at 12 months (76%). Only 23% of participant’s who did not meet the physical activity recommendations at 6 months, progressed to meeting the recommendations at 12 months. This suggests that if a program is not successful at changing physical activity program by 6 months, the program is not likely to increase physical activity over the maintenance period of 12 months. The stage-tailored group was significantly more likely to meet the CDC/ACSM recommendations at 6 month and at 12 months. The stage-tailored group illustrated greater minutes of physical activity at 6 months and at 12 months. However, the only significance for minutes of physical activity between the groups was found at 6 months. A possible explanation for the CDC/ACSM recommendations being significant, but not the minutes could be the variability of minutes recalled as compared to the categorical results for CDC/ACSM recommendations (Bock, Marcus, Pinto, & Forsyth, 2001).

Blissmer & McAuley (2002) conducted a study among faculty and staff at a large Midwestern university. The purpose of the study was to examine the effectiveness of a stage-matched intervention versus stage-mismatched, standard care, and control interventions for changing physical activity levels in a group of adults over a period of 16 weeks. The sample
consisted of current exercisers, non-exercisers, and those not even interested in exercising were encouraged to participate. Participants were informed that they would be eligible for a $100 drawing for each monthly questionnaire packet they returned. Eligibility for the study included those individuals who completed the informed consent and had no conditions, according to the PAR, that would inhibit them from exercising. Exercise stage was measured by given a short paragraph, then participants were questioned on their activity status or their intention to engage in physical activity. No reliability or validity was reported for this instrument. Physical activity behavior was measured using the Aerobic Center Longitudinal Study Physical Activity Questionnaire (Kohl, Blair, Paffenbarger, et al., 1988). Study participants were randomized into one of four conditions (stage-matched, stage-mismatched, standard care, or control group). Participants in the “stage-matched” group received stage-matched material via campus mail on a monthly basis. Each packet contained a manual and cover letter. In the precontemplation manual, the focus was on enhancing the perceived benefits of physical activity. In the contemplation manual, the focus was on minimizing the negative consequences, increasing emotional awareness, and gathering more information. The preparation manual, the focus was social support and making a commitment to be physically active. The action manual focused on replacing bad habits with good habits, avoiding situations that lead to inactivity, and to develop rewards for activity. The maintenance manual covered dealing with setbacks and avoiding activity limiting situations. Individuals in the “stage-mismatched” were given the same stage-specific manuals as the “stage-matched” group. However, individuals in the “stage-mismatched” received manuals that were not stage appropriate. Allocation of mismatched manuals to individuals was determined randomly, however, individuals could not receive the manual that was appropriate for their current stage. Individuals in the mismatched group were given manuals once a month. Individuals in the standard care group were given four manuals from the American Heart Association on a monthly basis. The four manuals received were “Walking for a Healthy Heart”, “Exercise Diary”, “Just Move”, and “Exercise and Your Heart: A Guide to Physical Activity”. Individuals
in the control condition were sent a general health pamphlet on a monthly basis. The information was purely educational in nature and did not include any type of behavioral strategy. The initial packet contained the stage of change and the physical activity measure. At the end of 4 weeks, study participants were sent a questionnaire to assess their stage of change. Study participants were contacted via email alerting them of another questionnaire that was to be sent. Those who failed to send back a completed questionnaire within 10 days were contacted again via email and prompted to complete a questionnaire. The sample consisted of 213 women and 75 men whose average age was 43.36 years (SD=10.9). The attrition rate over the 16 week program was 32%. A MANOVA revealed a significant effect for time \[F(2,147)=5.10, p<.01\], with nonsignificant effects for study condition and Time*Study condition interaction. The ANOVA indicated that neither total activity nor lifestyle activity significantly differed across time. The pattern revealed that the stage-matched and standard care groups increased life-style activity behavior and total activity, while the mismatched group and control group decreased lifestyle activity and total activity. The authors conclude that the study supports that stage-matched material increased total activity (Blissmer & McAuley, 2002).

**Summary of Studies that Utilize AHA brochures:**

Six studies were found that compared a stage of change-based intervention to a standard intervention. Only one study (Cardinal & Sachs, 1995) compared lifestyle stage of change intervention to a structured exercise stage of change intervention, to a fitness-only educational program. Neither intervention was significantly associated with stage of change progression at 7 months. This would indicate that type of activity does not determine stage progression.

Only study compared a stage of change-based group to a group that received information based on the Surgeon General’s Report (SGR)(Peterson & Aldana, 1999). The results from the 6-week study indicated that the stage of change group increase their activity
by 13%, while the group that received the SGR increased their activity by only 1%. The control group decreased their physical activity by 8%. This study would indicate that stage-based information produces significantly greater increase in physical activity as compared to a standard intervention or a control group. Although the group that received the SGR only increased activity by 1%, this group did not actually produce a decrease in physical activity (as in the control group). This may indicate that the SGR may not be effective for increasing physical activity; it may be effective in keeping people to maintain current activity rates or help with stopping regression of physical activity rates.

Four studies compared a stage of change group with a standard group that received brochures from the American Heart Association (AHA)[ Marcus, Bock et al., 1998; Bock, Marcus et al., 1998; Marcus, Emmons, et al., 1998; Blissmer & McAuley, 2002]. In all four studies, the trend was that the stage-based group reported more physical activity minutes than the AHA group. Two articles reported (Marcus, Bock et al., 1998; Bock, Marcus et al., 1998) the trend for the stage-based group to report greater minutes of physical activity, to be significant. It should be noted that these two articles are based on the same study. In the study by Marcus, Bock, et al. (1998) and Bock, Marcus, et al. (1998) the AHA group reported low activity minutes, as compared to the stage-based group. The AHA group reported range of 43-54 minutes of physical activity below that of the stage-based group. In conclusion, the both the stage-based group and the American Heart Association group intervention were successful in increasing rates of physical activity. However, the stage-based groups had more of an impact on levels of physical activity.
Chapter Two Summary

Physical inactivity is a health concern according to governmental documents (Healthy People 2010, 1996 Surgeon General's Report). Data from the 1992 BRFSS, 1991 NHIS, NHANES III studies indicate that during the early and mid 1990’s, adults aged 18 and older reporting ‘no leisure time activity’ ranged from 21-28%. However, around the turn of the century, no leisure time physical activity rates appeared to jump to 40% (Healthy People, 2010).

To combat the health concern of physical inactivity numerous constructs have been studied as possible determinants of physical activity. Descriptive studies [Petosa, Suminski, & Hertz, 2003; and Sallis et al., 1989, 1992] as well literature reviews conducted by Dishman, Sallis, Orenstein (1985), King, Blair, et al. (1992), and Buckworth (2000) indicate that the variables of social support, self-efficacy, and self-regulation are significantly associated with physical activity. Intervention studies (Hallam & Petosa, 1998, 2004; Grim, 2003) would support that programs based on the Social Cognitive Theory (SCT) have potential for impacting short term adherence for physical activity behavior. The results from Hallam & Petosa (1998, 2004) and Grim (2003) the SCT variable of self-regulation appears to be the strongest predictor of physical activity. Outcome expectancy value appears to have the weakest correlation with physical activity.

Studies have been conducted to determine the intensity and structure of an exercise regimen that would have the greatest impact on physical activity. Sixteen home-based studies were examined. The literature on home-based studies would support that for the sedentary, adult population, home-based/lifestyle-exercise regimens produce greater adherence rates versus structure-exercise regimens. Six studies compared home versus structured exercise regimen. Five of those six studies found significantly greater adherence among home vs. structured groups [King, Haskell, Taylor et al. (1991); King, Haskell, Taylor et al. (1995; Oman& King (1998); Perri et al. (1997); Garcia and King (1991); Andresen et al. (1999)]. King,
Haskell, Young et al. (1995) and King, Haskell, Taylor et al. (1991) revealed that the home-based groups were both higher than the structured exercise group at Year 1. The average adherence for high-intensity-home mean=78.7 ± 33.9%; the low-intensity home mean=75.1± 31.8%; and the structured-group mean -52.6% ± 29.8% [p<.0005]. At Year 2, home-based high intensity group were higher than the low-intensity home-based group and high-intensity structured group. Year 2 average adherence rates were: high intensity home: 67.8 ± 46.0%; low intensity home: 49.0 ± 42.7%, and structured group: 36.4 ± 33.0%. Perri et al. (1997) reported that the frequency of exercise for home-based group was marginally significant with 4.26 days/week, versus the structured group was 3.28 days/week (p<.06) at 6 months. For Year 1, participants in home had significantly higher exercise participation than the structured group at 12 months (p<.05).

Two studies were found that indicated that the structured-exercise groups had higher adherence than the home-based groups [Cox, et al., (2003); and Dunn, Marcus, et al. (1997)]. Dunn, Marcus, et al. (1997) conducted the study Project Active. The authors reported that at 6 month, 78% of lifestyle met CDC (30 minutes for 5 days per week), and 85% of structured group met criteria (20-60 minutes, 3-5 days/week). However, Dunn, Marcus, Kampert (1999) reported at 12 months, home-based group had greater adherence than structured-group, but this was not significant. The authors reported that 39% of lifestyle & 35% of structured group had a maintained an adherence of 70% or more at 12 months. No differences were found between the groups at 2 years. Cox et al. (2003) reported that structured group had greater adherence as compared to the home group at 6 months. At month 18, structured group reported more, though not significant.

It appears that results are mixed for short term adherence rates (6-12 months). Two studies indicated that the structured group had higher adherence rates than the home-based group. Six studies indicate that the home-based group had higher adherence than the structure-group. However, in both scenarios by Year 2, difference between the groups cannot be found. This would indicate regardless of which group displays greater adherence at 6
months, both home-based groups and structured-groups cannot maintain adherence for longer durations of time.

Intensity level of a home-based exercise regimen appears to have no impact on short or long term adherence rates [Gossard, et al. (1986); King, Haskell, et al. (1991); King, Haskell, et al (1995); Garcia & King (1991)]. The studies indicate that low-intensity and high-intensity home-based groups had similar adherence rates. However, intensity may impact structured-group adherence rates. Cox et al. (2003) reported that the low-intensity structured-group had higher adherence rates than the high-intensity structured-group.

The study conducted by Grim (2003) revealed promising results of a web-based physical activity intervention in college students. This study was among the first studies to use a web-based intervention. It was also among the few interventions found that were based on the Social Cognitive Theory. This study was structured in the format of a class-structure. Students received credit and a grade as part of the program. However, because it was considered as part of a curriculum in a structured setting, the implications of the program in an adult setting in an unstructured, voluntary program has yet to be established.

Hallam & Petosa (1998) conducted a study based on the Social Cognitive Theory. This program met twice a week for a period of four weeks. This program was conducted in a worksite setting. Hallam & Petosa (1998) were successful at changing self-regulation, but not self-efficacy. This pattern was also seen in the Grim (2003) study. Self-regulation was the only construct maintained in the regression equation. This study also revealed that levels of self-efficacy fell at follow-up. The results from the Hallam & Petosa (1998) and Grim (2003) reveal that the variable of self-regulation is modifiable. The results from these studies also indicate that more research in needed to determine the relationship between self-efficacy and physical activity. Six studies were found that compared a stage-based intervention to a standard intervention. Four of those studies compared a stage-based intervention to a group that received educational information from the American Heart Association (Marcus, Emmons, et al., 1998; Marcus, Bock, et al. 1998; Bock, Marcus, et al, 1998; and Blissmer & McAuley,
2002). In all four studies both the stage-based intervention, as well as the American Heart Association intervention increase physical activity.

A study has yet to be developed that compares an intervention based on the Social Cognitive Theory to an intervention consisting of educational material from the American Heart Association. To meet this need, a self-directed intervention was developed for adults in a community setting. Two studies could be found that have measured use of self-regulation skills (Grim, 2003 and Hallam & Petosa, 1998). More research is needed to determine how use of self-regulation can influence physical activity in voluntary, non-structured community environment. One home-based study was found that measured some type of social support (Dunn et al., 1997). In this study, ‘enlisting social support’ was a significant predictor of physical activity. More research is needed to determine what role social support plays in a home-based program designed for the community. Four home-based studies were found that measured self-efficacy (Dunn et al., 1997; Garcia & King, 1991; Oman & King, 1998; and Wilbur et al., 2003). These studies indicate that self-efficacy was a significant predictor. However, Hallam & Petosa (1998) indicated that self-efficacy was not a significant predictor of physical activity. In the studies by (Grim, 2003 and Hallam & Petosa, 1998), self-efficacy actual dropped for the treatment group during the duration of the study. More research needs to be conducted to examine this phenomenon. The variables of self-efficacy, self-regulation, and social support (from the SCT) were chosen to address that issues stated above.
CHAPTER 3

METHODS

Introduction

Physical activity is important for the prevention of many chronic condition and diseases, such as heart disease, high blood pressure, and diabetes. Despite the knowledge of the benefits of physical activity, few adults engage in enough physical activity to gain health benefits. Furthermore, gaps remain in understanding the most effective way to increase physical activity behavior (King, Haskell, Taylor, et al., 1991).

Supervised group exercise session represent the most common type of formal exercise. Structured or group-based exercise programs have been demonstrated to have a positive impact on exercise adherence and maintenance. One limitation of structured-exercise programs is that those programs require a fitness instructor and the participant be a paying member to a facility. A second limitation is that the structured-activity approach to physical activity can be expensive and time consuming (King et al. 1991, 1995).

Studies show that most people prefer to exercise on their own, rather than a formal class (King et al, 1990). Individually, prescribed home-based regimens that are supervised by telephone and mail have proven effective in maintaining exercise participation among healthy individuals (King, Haskell, et al., 1991).

Home-based physical activity programs are characterized by utilizing a self-directed program in which participants are not required to attend a structured exercise program at a fitness facility.
Purpose of the Study

The purpose of the study was to evaluate the effectiveness of the Take Control intervention to promote days of physical activity among adults in a targeted neighborhood, as compared to a standard education intervention (Just Move). The Just Move intervention was implemented to act as a comparison group. Both programs were home-based interventions designed to increase days of moderate and vigorous activity among adults. The Take Control intervention was based on the SCT theory. Participants in the Take Control intervention received at their home, a series of self-guided worksheets that were tailored to address specific SCT constructs. Each worksheet required participants to actively engage in activities related to the targeted SCT theory construct. The Just Move intervention was a standard educational home-based physical activity program. In the Just Move intervention participants received two information-only American Heart Association brochures, “Exercise and Your Heart” and “Just Move”. The brochures discussed concepts from the Take Control intervention (See Table 3.8 and Table 3.9). However, the discussion was brief, consisting of 2-3 sentences and did not elaborate on any concept. Just Move participants were not required to act upon any material read in the either brochure. The Just Move participants did not receive any material that specifically addressed a particular SCT construct.

Evaluation Techniques:

The evaluation of the Take Control and Just Move interventions was conducted by a three-level approach: behavioral impact evaluation, construct validation of the treatment evaluation, and process evaluation. The first level was to conduct a behavioral impact evaluation for the Take Control and Just Move interventions. All participants completed a seven-day recall of physical activity at pretest(wk1), posttest(wk8), and follow-up(wk12). If the Take Control and/or the Just Move interventions were successful at increasing days of physical activity, then an increase should be seen from pretest to posttest. In essence, one is
measuring the effectiveness of the intervention to increase days of physical activity. To
determine the level of change in physical activity, a 2X3 mixed model ANOVA was conducted
on days of moderate physical activity, days of vigorous physical activity, and days of total
physical activity.

A second purpose of the study was to conduct a construct validation of the treatment. All participants completed a questionnaire at pretest(wk1), posttest(wk8), and follow-up(wk12). The questionnaire measured the constructs of self-regulation, self-efficacy, and social support. In construct validation, one is interested in the impact the intervention(s) had on the targeted theoretical constructs. If the Take Control and/or the Just Move interventions were successful at increasing any of the targeted SCT constructs, then an increase should be seen from pretest to posttest. To examine construct validation of the treatment, a 2X3 mixed model ANOVA was conducted on self-efficacy, social support, and self-regulation.

Thirdly, a process evaluation was conducted. The process evaluation was designed to determine if both interventions were implemented as designed. The process evaluation was measured in four areas: (1) costumer satisfaction questionnaire, (2) length of time to return worksheets/questionnaires, (3) level of contact with participants and (4) completeness of worksheets and exercise logs. The first area was ‘customer satisfaction of intervention’. Subjects were questioned on usefulness of various aspects (such as goal setting, exercise logs, worksheets, & brochures) of the Take Control and the Just Move interventions. Length of time to return worksheets/questionnaires and level of contact with participants was tracked to assess level of delivering. Each week, the researcher tracked the extent of the contact with each participant. The range of contact was scored on a scale of 1-5.

1 = no face-to-face contact
2= dropped off lesson with quick hello
3= dropped off lesson with 1-2 minute conversation
4= dropped off lesson with 3-5 minute conversation
5= extensive conversation or meeting
Completeness of worksheets or exercise logs was tracked to assess the extent of effort put forth by the participant to complete the worksheets or exercise logs. A limitation of a home-based program is that the researcher cannot directly observe participation. To help compensate for lack of direct observation, the researcher subjectively evaluated each worksheet and exercise log for level of completeness. Each worksheet and log was scored on a scale of 0 to 5.

- 0 = not completed at all
- 1 = missing several sections on worksheet or exercise log
- 2 = missing one section on worksheet or exercise log
- 3 = completed, but appeared to be ‘copying’ from one section to another
- 4 = completed, but finished it when being picked up
- 5 = completed as intended

Description of Targeted Neighborhood:

Medary is a low to middle income community located north of The Ohio State University’s main campus. A CDC grant entitled Neighborhoods on the Move (NOM) was being conducted in this community. The Take Control and the Just Move programs were implemented as part of the community-outreach branch of NOM. There were 108 males (40.8%) and 157 females (59.2%) that completed the NOM pretest neighborhood questionnaire. The average age of those who completed the questionnaire was 36.81 years old. Table 3.1 illustrates the educational demographics of participants who completed the NOM pretest neighborhood questionnaire. Table 3.2 illustrates the ethnicity demographic information.
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<thead>
<tr>
<th>Highest Degree Held</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No High School Degree</td>
<td>2.3%</td>
</tr>
<tr>
<td>High School Degree</td>
<td>35.8%</td>
</tr>
<tr>
<td>College Degree</td>
<td>41.5%</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

Table 3.1: Education: Highest Degree Held

<table>
<thead>
<tr>
<th>Race</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>78.9%</td>
</tr>
<tr>
<td>African American</td>
<td>3.0%</td>
</tr>
<tr>
<td>Asian American</td>
<td>2.6%</td>
</tr>
<tr>
<td>White Appalachian</td>
<td>4.9%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.3%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>4.5%</td>
</tr>
<tr>
<td>Native American</td>
<td>0.4%</td>
</tr>
<tr>
<td>Other</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

Table 3.2: Ethnicity Demographics
The questionnaire asked participants about their perception of community residents who exercise on a regular basis. Participants responded that they perceived that 32% of the community engages in exercise on a regular basis. Subjects were also questioned on minutes engaged in sedentary behavior, moderate exercise, vigorous exercise, and a combination of moderate & vigorous activity. Table 3.3 illustrates the results.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mean (minutes)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary Total</td>
<td>1645.01</td>
<td>864.06</td>
</tr>
<tr>
<td>Moderate Exercise</td>
<td>136.79</td>
<td>152.46</td>
</tr>
<tr>
<td>Vigorous Exercise</td>
<td>39.71</td>
<td>83.29</td>
</tr>
<tr>
<td>Mod-Vig Exercise</td>
<td>73.06</td>
<td>130.62</td>
</tr>
</tbody>
</table>

Table 3.3: Minutes Reported based on the NOM pretest neighborhood questionnaire

Procedure for Recruiting Subjects:

Recruitment of individuals can be classified as either reactive or proactive. Reactive recruitment occurs when the potential participant reacts to an advertisement. In contrast, proactive recruitment contacts participants directly and offer the services to them (Marcus, Nigg, Riebe, & Forsyth, 2000). Proactive recruitment also addresses people who may not be motivated to engage in the behavior of interest (Nigg, Courneya, & Estabrook, 1997).

In this study, both proactive and reactive techniques were utilized. The reactive procedures included advertisements and articles in the newsletter. All members living in the Medary neighborhood received monthly newsletters as a part of a larger community intervention, Neighborhoods on the Move. A self-directed, home-based physical activity program was advertised in this monthly newsletter for the entire duration of the study. In addition to the advertisements, “Success Stories” were published in the newsletter.
“Success Stories” consisted of current members describing how the home-based program helped them with various aspects of their lives. In addition to the monthly newsletters, flyers were distributed throughout neighborhood shops and business and to homes located in the Medary neighborhood. Flyers were distributed in local businesses and shops where permission was granted. A random sample of streets, in the Medary neighborhood, was selected to receive door-to-door flyers. Interested persons, recruited from the flyer or newsletter, were required to call a designated phone number or to email a designated address for pre-assessment. Participants were questioned on: age, disease status (as measured by the PAR –Q), how they heard of the program, and if they met the moderate or vigorous standards (Telephone script attached in Appendix A). To be eligible for participation, subjects had to be 18 years old or older and free of disease that would limit their participation in physical activity.

A proactive technique was also implemented. A random sample of phone numbers from the neighborhood was obtained. If the person was not home, the researcher phoned at another time during the same day or on a different day. No voice messages were left for the participant for the purposes of recruitment.

In addition to the researcher conducting recruitment, each participant was encouraged to recruit family and friends to join. Participants who recruited one person to be in the study received a set of strengthen bands. Participants who recruit two or more new members received a yoga ball. Table 3.4 illustrates the results from recruitment.
Recruitment Procedures | Take Control | Just Move |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proactive (telephone script)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Reactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door to Door Flyers</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Newsletters</td>
<td>12*</td>
<td>8</td>
</tr>
<tr>
<td>Recruitment of Friends &amp; Family from Current Participants</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 3.4: Results from Proactive and Reactive Recruitment Techniques

* 2 subjects dropped after week 1

Group Assignment Procedure:

A procedure was implemented to assign each subject to either the Take Control intervention or the Just Move intervention. The purpose of the group assignment procedure was to reduce random error and to reduce contamination between the Take Control and the Just Move groups. The researcher went to great lengths to ensure Take Control subjects and Just Move subjects had no knowledge or contact of one another. Two subject pools began to exist: “New Subjects” and “Within Group Recruited Subjects”. A “New Subject” is a participant who is responding to a recruitment method (phone calls, newsletter, or door-to-door flyer) and has no contact with a current member of either the Take Control group or the Just Move group. A “Within Group Recruited Subject” is a new participant who has been recruited by a current member in either the Take Control or Just Move group.

New Subjects:

A random digit table was used to determine group assignment for new subjects. The researchers closed her eyes and randomly pick a number on the table. If the number selected was an even number then the participant was assigned to the Take Control group. If the number selected was an odd number then the participant was assigned to the Just Move group. If multiple subjects joined together (spouses, friends, neighbors) then the joined
subjects were randomly assigned as a unit (not as individuals) to a group. Grouping “joined subject” together is the same group was to reduce contamination between the groups.

*Within Group Recruitment Subjects:*

When an active participant (Take Control or Just Move) recruited a new member; the new member was assigned to the same group as the active member. This was to reduce contamination.

*Informed Consent/PAR Q:*

At pretest a Par-Q (Physical Activity Readiness Questionnaire) was distributed (Appendix B). The purpose of the Par-Q was to determine if the participant was medically and physically able to engage in physical activity. Anyone who answered “yes” to any of the questions was not allowed to participate in the study or activities unless proof of clearance by physician was produced. Each participant was required to sign an informed consent form (Appendix C).

Questionnaires were treated with confidentiality. Each questionnaire was coded with a number. Once the questionnaire had been returned, the name and address of the individual was separated from the questionnaire and the code was used for tracking purposes only. Once all data were collected and the database was formed, identifying markers were removed.

*Estimates for Sample Size:*

Home-based literature was analyzed to assess the sample size used in published home-based physical activity studies. Thirty percent of the home-bases studies used a sample size of 30 subjects per group (See Appendix G).
**Missing Data:**

Participants in the Take Control group and in the Just Move group must have completed 80% of logs, 80% of worksheets, and 80% of each questionnaire instrument at pretest and posttest to be included in the post-treatment analysis and have 80% of the pretest, posttest, and follow-up to be included in the follow-up analysis. To preserve sample size, if less than 20% of an instrument had missing data, missing data was treated by imputing the mean for the sub-scale, or the total instrument (if no subscales exist). To be included in the analysis, 5 out of 6 lessons must be completed. For this study, subjects completed every worksheet and questionnaire. There was no missing data to impute.

**Examining Drop-Outs:**

If a subject (in the Take Control or Just Move group) failed to return a worksheet or log, then the subject was phoned or emailed to ascertain status of involvement. If the subject reported that he or she wished to drop-out, then a small interview consisting of 3-4 questions was conducted to determine the reasons. Two attempts, at least 2 days a part, were made to contact the participant. If after the two attempts, there was still no response, the subject was considered a “drop-out”.

Two subjects from the Take Control group dropped in week 2. The researcher made two separate attempts to contact the persons. The two subjects did not return the researchers phone calls therefore an interview was not possible.
Methods

Discussed in this section are recruitment of subjects, decision making for groups, informed consent and sample size. The design of the study is a quasi-experimental 6 week pretest/posttest, 4 week follow-up study.

Figure 3.1: Design of Current Study
Description of Program

The target audience for the study was adults aged 18 or older in the Medary neighborhood. The targeted neighborhood consisted of a census track of roughly 4,000 people. Participants were given a 6 week intervention program, with a 4 week maintenance phase. Figure 3.1 and Figure 3.2 illustrates the components of the study. All subjects (both Take Control and Just Move) received the packet of information that included: types of fitness, ACSM recommendations, weight management, injury prevention, and community resources (See Appendix F). Each participant also received two envelopes. The envelopes were used as a method of exchanging material. Participants in the Take Control and the Just Move group received weekly phone prompts. In both groups, each participant set weekly goals and monitored their physical activity via an activity log. Feedback on logs was provided to all participants. All subjects were eligible for incentives including keychain, pedometer, jump rope or hand-weights, and $10 per completed questionnaire. A detailed description of the Take Control group and the Just Move group follows below.
Figure 3.2: Diagram of Components of the Take Control and the Just Move Intervention

Description of the Just Move Intervention:

The Just Move intervention was a 6 week pretest/posttest design, followed by a 4 week maintenance phase. During week 1, all participants received a packet of useful educational material such as: types of fitness, ACSM recommendations for physical activity, community resources, etc. Each week participants were to set weekly goals and to monitor their physical activity via exercise logs. As part of the Just Move intervention, participants received two American Heart Association brochures: Exercise and Your Heart and Just Move. The Just Move brochure was distributed to participants at week 1 and the Exercise and Your Heart brochure was distributed at week 3. As an incentive for completing the material,
participants received a key chain, pedometer, jump rope or hand weight. The key chain was received at week 1 for completion of the pretest questionnaire. The pedometer was distributed at week 3. Participants were required to track their daily steps via the pedometer for a period of one week. The jump rope or hand weight was received as an incentive for completing the 6 week intervention. At week 8, participants received the posttest questionnaire. Participants received a $10 incentive for completing the posttest questionnaire. Participants had no contact with the researcher for a period of 4 weeks. At week 12, participants were contacted to complete the follow-up questionnaire. Participants received $10 for completing the follow-up questionnaire. Below is a detailed description of the procedures for the Just Move Intervention.

**Just Move Intervention Procedures:**

Participants in the Just Move group met with the researcher at week 1 to receive the informational packet (weight management, types of fitness, ACSM recommendations, injury prevention, community resources); 2 envelopes (to exchange lessons); a key chain incentive; and the pretest questionnaire. The Just Move participants also received the American Heart Association’s (AHA) “Just Move” brochure and logs for week 1-2. At the pretest time, the participants were informed that the researcher would return during week 3 to pick up the logs from week 1-2 and to drop off the AHA’s “Exercise and Your Heart” brochure along with logs for week 3-6. Each participant was called every Sunday as a reminder to set their weekly goal and to monitor their physical activity. In addition, each participant was called the day before the scheduled ‘pick up’ date as a reminder. If the participant was not at home, a voice mail reminding the participant of the pick up date was given. Participants were to call or email the researcher if the material was not completed or if the participant needed more time to complete the material. During week 3, the researcher visited the participant’s home to drop off the Exercise and Your Heart brochure and pedometer; retrieve the ‘old’ logs (week 1-2), and to distribute the ‘new’ logs (week 3-6). Participants were instructed to put the ‘old’ logs in one
of the designated envelopes and to set the envelope out on the front porch (or some other designated spot). The researcher used the second envelope to drop off the 'new' log (week 3-6) and the pedometer incentive at the participant’s home. If the envelope containing the 'old' log was not present at the time the researcher came to drop off the envelope containing the 'new' log, a reminder note was inserted into the 'new' log envelope. The envelope containing the 'old' log was picked up at a time designated by the participant. The data from week 1-2 was inserted into the data set and then the logs were returned to the participant. The researcher provided feedback on the logs in the form of encouragement for the participant to achieve one of the ACSM recommendations. At the end of week 6, the researcher visited the participant's home to pick up the 'old' logs (week 3-6) and to drop off the maintenance logs (week 7-12). The data from week 3-6 was inserted into the data set and then the logs were returned to the participant. The researcher provided feedback on the logs in the form of encouragement to achieve one of the ACSM recommendations.

Provided that all logs were complete, the participant received an incentive of either a jump rope or a set of 1 pound weights. During week 8, the researcher returned to drop off the posttest questionnaire. The participant was allotted one week to complete the posttest questionnaire. If after one week the participant had not returned the posttest questionnaire, then the participant was called to determine a pick-up date. Once the posttest questionnaire was retrieved, the participant received $10 in cash. At the beginning of week 12, the researcher returned to the participant’s house to drop off the follow-up questionnaire. The participant was allotted one week to complete the follow-up questionnaire. At the end of week 12, the researcher returned to participant’s house to pick up the maintenance logs (week 7-12) and to pick up the follow-up questionnaire. If the participant had not returned the follow-up questionnaire at the end of week 12, the participant was called to determine a pick-up date. Once the follow-up questionnaire was retrieved the participant received $10 in cash, as an incentive.
Description of the Take Control Intervention:

The Take Control Intervention was a 6 week pretest/posttest, followed by a 4 week maintenance phase. At week 1, participants received a packet containing useful educational material such as: ACSM physical activity recommendations, types of fitness, and community resources (See Figure 3.2). Each week participants received weekly worksheets that were designed to address a specific SCT theory. Example topics include: Exercise Preference, Overcoming Barriers, Social Support, Long Term Adherence, etc. Each week participants were also instructed to set a weekly exercise goal and to monitor their physical activity via exercise logs. Participants of the Take Control intervention received incentives such as: key chains, pedometers, and jump ropes or hand weights. The key chain was received at week 1 for completion of the pretest questionnaire. The pedometer was received at week 3. Participants were required to track daily steps via the pedometer for a period of one week. The jump rope or hand weight was received as an incentive for completion of the 6 week intervention. At week 8, participants received the posttest questionnaire. Participants received a $10 incentive for completion of the posttest questionnaire. Participants had no contact with the researcher for a period of 4 weeks. At week 12, participants were contacted to complete the follow-up questionnaire. Participants received $10 for completion of the follow-up questionnaire. Below is a detailed description of the Take Control procedures.

Take Control Procedures:

Participants in the Take Control met with the researcher at week 1 to receive the informational packet (weight management, types of fitness, ACSM recommendations, injury prevention, community resources); 2 envelopes (to exchange lessons); key chain incentive; and the pretest questionnaire. Each Take Control participant was set up on a weekly schedule. Every lesson was designed to allow the participant a period of one week to complete the lesson and log. Each participant was called the day before the scheduled ‘pick up’ date as a reminder. If the participant was not at home, a voice mail reminder was left for
the participant. Participants were to call or email the researcher if the material was not completed or if the participant needed more time to complete the lesson. The researcher visited the participant’s home every week on the designated ‘pick-up’ date to pick up the ‘old’ lesson and to drop off the ‘new’ lesson. Participants were instructed to put the ‘old’ lesson in one of the designated envelopes and to set the envelope out on the front porch (or another designated spot). The researcher used the second envelope to drop off the ‘new’ lesson at the participant’s house. If the envelope containing the ‘old’ lesson was not present at the time the researcher came to drop off the envelope containing the ‘new’ lesson, a reminder note was included into the ‘new’ lesson envelope. The envelope containing the ‘old’ lesson was picked up the following week or at a time designated by the participant. At week 3, provided that all lessons and logs were completed, the participant received a pedometer as an incentive. Participants were required to monitor daily steps for a period of one week. At week 6, provided that all lessons and logs were complete, then the participant received either a jump rope or a one pound hand weight as an incentive for completing the program. During week 8, the posttest was dropped off at the participant’s house. The participant was allotted one week to complete the posttest questionnaire. If the posttest questionnaire was not returned after one week, the participant was called to determine a pick-up date. Once the posttest questionnaire was retrieved, the participant received a $10 cash incentive. During week 12, the follow-up questionnaire was distributed. The participant was allotted one week to complete the follow-up questionnaire. If the follow-up questionnaire was not returned after one week, the participant was called to determine a pick-up date. Once the follow-up questionnaire was retrieved, the participant received a $10 cash incentive.

Logs:
Each Take Control participant received a weekly log along with each lesson. The weekly log contained a goal-setting section and physical activity section. The goal setting section contained a list of questions that were designed to facilitate the participant to think of all the
aspects of a goal (what type of activity, how many days per week, how long each session, intensity of activity). For the physical activity section, participants were to report days, minutes, intensity, and type of activity. Each week, an additional section was added to the log that was specific for the lesson (See Appendix D for log examples). For example- lesson 3 addressed barriers and plan of action – the log for lesson 3 added a section on plan of action. During week 3, the participant received a pedometer to monitor daily steps. A “Daily Steps” section was added to all logs for weeks 3, 4, 5, 6, and the maintenance logs (week 7-12). Participants were required to monitor daily steps (as registered by the pedometer) for a period of one week (usually during week 3). Participants had the option to continue monitoring daily steps throughout the study (week 4-12).

Feedback:
The researcher provided each Take Control participant feedback on the worksheet and on the log. If the participant did not complete a section of the worksheet; the researcher returned the lesson and instructed the participant to complete the lesson. The researcher also provided feedback on the logs and goals. The participants were encouraged to meet one of the ACSM recommendations (See Appendix F). If the participant was not engaging in activity at a level that met one of the ACSM recommendations, then the researcher provided feedback encouraging the participants to meet one of the ACSM recommendations.
Description of Take Control Worksheets

[See Appendix E for outline of Take Control Worksheets]

[See Appendix F for packet information]

Week 1: Pre/Test questionnaire, ParQ, Informed Consent, Logs, and Goal Setting;

Week 1: Creating your Personal Exercise Plan

During the first week, participants met with the researcher to complete the pretest, the ParQ, and informed consent. Participants also received a packet that contained educational information and resources in the community.

Goal Setting: Participants were to write weekly goals. Measurable goals include: “what” activity was performed, “how many” days per week an activity was performed, “how long” an activity lasted. Questions were provided for the participant to help walk participants through the goal-setting process.

Logs: During week 1, participants were to monitor days of activity, minutes of activity, and perceived intensity level in their weekly logs.

Creating your Personal Exercise Plan: In this activity, participants were to answer questions to ascertain their preferences for activity. For example, participants were asked if they liked to exercise: alone, with groups, at home, in a gym, etc. Participants were asked types of activities that they preferred such as, step aerobics, pilates, yoga, bicycling, swimming, etc. At the end of the lesson, participants were to list several activities that they perceived as enjoyable.

Week 2: Change Your Environment and Find Your Exercise Comfort Zone

Change Your Environment: In this lesson participants were given environment cues such as: placing exercise equipment in prominent place, identifying groups (such as walking clubs), identifying desirable and
convenient environments (such as walking routes), and enhanced environments (watching TV or listening to music while exercising).

**Comfort Zone:** Participants were also instructed on how to determine their own comfort zone. Participants were instructed to walk slowly for 5 minutes, walk at a medium pace for 5 minutes, walk as fast as you can for 5 minutes, jog at a slow speed for 5 minutes, and jog at a medium speed for 5 minutes. Participants were asked rate their level of comfort (too easy, easy, comfortable, hard, very hard) at each level.

**Logs:** Participants were asked to complete the goal setting section and to monitor their physical activity. Participants were also to identify environmental cues that were attempted.

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Week 3: Overcoming Barriers

**Overcoming Barriers:** Participants were required to write five barriers that have encountered or believe they will encounter over the course of the intervention. Participants were then to provide a plan of action to overcome the barriers.

**Logs:** Participants were asked to complete the goal setting section and to monitor their physical activity, and to monitor daily steps via a step pedometer.

---

Week 4: Time Management

**Time Management:** Participants were taught strategies designating more time for physical activity. A time management sheet was provided to the participants. Participants were to keep track of the time they spent in various activities. This assignment was designed to increase awareness of where their time is spent.
**Logs:** Participants were asked to complete the goal setting section and to monitor their physical activity, with the option of monitoring daily steps.

**Week 5: Social Support**

**Social Support:** Participants were asked to find 3 people to help them address the 3 areas of social support. The first social support step was to find an ‘exercise buddy’. Participants were to recruit someone to exercise with them. The second type of social support was ‘time relief’. In this step, participants were asked to recruit someone to take over responsibilities such as, taking over domestic responsibilities or taking over childcare. The third type of social support was ‘encouragement’. In this step participants were asked to recruit a person that would give encouragement for the participant to continue exercising.

**Logs:** Participants were asked to complete the goal setting section and to monitor their physical activity, with the option of monitoring daily steps.

**Week 6: Long Term Adherence**

**Long Term Adherence:** In this lesson, participants were to reflect over the past lessons and to rate usefulness of each of the lessons. Participants were to rate the likelihood of use of each lesson in the future. Participants were also to identify activities that could be conducted during each season (winter, fall, summer, and spring).

**Logs:** Participants were asked to complete the goal setting section and to monitor their physical activity, with the option of monitoring daily steps.
<table>
<thead>
<tr>
<th>WEEK</th>
<th>TAKE CONTROL</th>
<th>Activities</th>
<th>JUST MOVE</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation</td>
<td>Incentives</td>
<td>Orientation</td>
<td>Incentives</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td>Key Chain</td>
<td>Pretest</td>
<td>Key Chain</td>
</tr>
<tr>
<td></td>
<td>Par Q/Informed</td>
<td></td>
<td>Consen</td>
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</tr>
<tr>
<td></td>
<td>Logs, Goal</td>
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<td>Logs</td>
<td></td>
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<td>Setting</td>
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<td>Change Your</td>
<td>Incentives</td>
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<td>Exercise</td>
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<td>Pedometer</td>
<td></td>
</tr>
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<td>Comfort Zone</td>
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<td></td>
<td></td>
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<td>Exercise</td>
<td>Exercise</td>
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</tr>
<tr>
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<td>Barriers</td>
<td>and Your</td>
<td>and Your</td>
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<tr>
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<td>receive $10</td>
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</tr>
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<td>Maintenance</td>
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<td>Collect Follow-Up Data</td>
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</tr>
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<td></td>
<td>receive $10</td>
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<td>receive $10</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.7: Weekly Worksheets for the Take Control and Just Move Interventions
Content of Worksheets:

The Take Control intervention consisted of 6 worksheets. The Just Move intervention consisted of 2 brochures: Just Move and Exercise & Your Heart. Both groups received the same incentives and goal-setting and self-monitoring exercise log. Table 3.8 illustrates the material covered in each brochure and in the worksheet.

<table>
<thead>
<tr>
<th>Take Control Group Intervention</th>
<th>Just Move Group Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outline of Worksheets</td>
<td>Outline of the Just Move Brochure</td>
</tr>
<tr>
<td>Exercise Preference</td>
<td>Why Exercise? (Benefits of PA)</td>
</tr>
<tr>
<td>Comfort Zone</td>
<td>What Kinds of Activities (recommendations; preference, progression)</td>
</tr>
<tr>
<td>Environmental Cues</td>
<td>Things to Consider (interest, equipment, scheduling)</td>
</tr>
<tr>
<td>Identifying Exercise Barriers</td>
<td>Getting Started (warm-up, conditioning period, cool-down)</td>
</tr>
<tr>
<td>Developing a Plan of Action to Address Exercise Barriers</td>
<td>Now That You Have Started (preference; social support)</td>
</tr>
<tr>
<td>Time Management</td>
<td>Calorie Chart</td>
</tr>
<tr>
<td>Social Support</td>
<td>Goals setting</td>
</tr>
<tr>
<td>Planning for Long Term Adherence</td>
<td>Self-Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.8: Worksheets for Take Control Group and the Just Move Group
Table 3.9 lists similar materials covered in the Take Control intervention and in the Just Move intervention. The Take Control lessons/worksheets are listed on the left-hand side. The comparable materials from the American Heart Association’s brochures are listed on the right-hand side. The chart indicates that many of the Take Control lessons are discussed in the American Heart brochures. However, with the AHA brochures, the discussion is very brief consisting of 2-3 sentences. The AHA brochures do not elaborate on any SCT construct. The Take Control intervention requires participants to not just read material, but to act upon the material. In each lesson, Take Control participants were to actively engage in various activities that were designed to address a specific SCT construct.

<table>
<thead>
<tr>
<th>Take Control Intervention Lessons/Worksheets</th>
<th>American Heart Associations’ Comparable Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Just Move brochure</td>
</tr>
<tr>
<td>Exercise Preference</td>
<td>Things to Consider, What Kinds of Activities, Now That You Have Started</td>
</tr>
<tr>
<td></td>
<td>Keys to Success</td>
</tr>
<tr>
<td>Comfort Zone</td>
<td>What Kinds of Activities</td>
</tr>
<tr>
<td></td>
<td>Myths about Exercise, Keys to Success</td>
</tr>
<tr>
<td>Identifying Barriers</td>
<td>Things to Consider</td>
</tr>
<tr>
<td></td>
<td>Keys to Success</td>
</tr>
<tr>
<td>Social Support</td>
<td>Now That You Have Started</td>
</tr>
<tr>
<td></td>
<td>How Do I Keep Going?</td>
</tr>
<tr>
<td>Long Term Adherence</td>
<td>How Do I Keep Going?</td>
</tr>
</tbody>
</table>

Table 3.9: Take Control Intervention Worksheets and the Comparable AHA Material

Self-Regulation Worksheets:

The majority of the Take Control Program (Just Move and Take Control interventions) focused on self-regulation. All participants in the Just Move intervention and in the Take Control intervention were required to set weekly goals and to monitor their physical activity via exercise logs. Chapter 3 describes each lesson in the Take Control intervention in detail. For the Take Control intervention, lessons 1, lesson 2, lesson 4, and lesson 6 were developed to address the variable of self-regulation (See Figure 3.3).
Social Support Worksheets:

Lesson 5 was designed to target social support. Participants were asked to find a person(s) to help them address three areas of social support – ‘exercise buddy’; ‘time relief’; and ‘encouragement’. In each of the three areas, participants were to recruit a friend or relative to provide them with the designated social support.

Self-Efficacy Worksheets:

Lesson 3 was designed to target self-efficacy. Participants were required to write five barriers that have encountered or believe they would encounter over the course of the intervention. Participants were then to provide a plan of action to overcome the barriers.

Figure 3.3: Take Control Intervention Worksheets and SCT Variable Targeted
Description of Instruments

Self-Regulation:

Self-regulation for physical activity was measured using a 52-item, 5-point Likert-type instrument (1=never, 5= most frequent). The purpose of this instrument was to assess the degree to which individuals systematically employ strategies (i.e., goal setting, self-monitoring, self-reinforcement, etc.) to regulate their physical activity. Test/retest reliability for the instrument has been demonstrated as r=.92. Internal consistency (Cronbach’s alpha) for the instrument was =.88. The possible range of scores for self-regulation is 52-260. A high score indicates frequent use of self-regulation skills (Petosa, 1993).

Self Efficacy:

Garcia and King (1991) developed the exercise self-efficacy instrument. It was composed of 14 items and measures one's perceived confidence to overcome barriers to exercise. The possible range of scores was 0 – 1400. The test-retest stability of the instrument was r = .96, p<. 0001. Internal consistency using chronbach’s alpha was .97. A high self-efficacy score indicates a high level of confidence to overcome physical activity barriers.

Social Support:

Social support was measured using an instrument validated by Trieber, Baranowski, Braden, and colleagues (1991). The instrument was composed of 2 subscales: social support for exercise provided by friends and social support provided by family. The questionnaire consisted of 12 questions, ranked on a Likert-type scales of 1 (never) to 5 (very often). The possible range of scores was 12 – 60. Test-retest stability coefficients were .55 for the family subscale and .86 for the friend subscale. Internal consistency was established using chronbach’s alpha, with coefficients of .61 and .91 respectively. Construct validity was established using factor analysis, and predictive validity was tested using a self-report measure of physical activity r = .46, p<.001.
Physical Activity Recall:

The seven-day recall of physical activity instrument developed by Dishman and Steinhardt (1990) and modified by Petosa (1993). The instrument is divided into moderate and vigorous activity. Subjects report days, minutes of activity, and type of activity for the past seven days for both moderate and vigorous physical activity. For moderate activity, 30 minutes or more of a single bout of activity had to be met in order for the activity to be counted as a “day” of moderate activity. For vigorous activity, 20 minutes or more of a single bout of activity have to be met in order for the activity to be counted as a “day” of vigorous activity. In past research, the correlation between seven-day diaries of physical activity and the recall instrument were .72. Test retest reliability over a four week time frame was r = .58 for free living and r = .72 for supervised physical activity (Petosa, 1993).

Data Analysis

Analysis:

Two groups (Take Control and Just Move) and three time periods (pretest, posttest, and follow-up) exist. The statistical analysis chosen for this project was a 2 (groups) X 3 (time periods) mixed model ANOVA. The mixed model ANOVA allows the researcher to analyze between group effects and time effects. The analysis determines if the variable changed across the time periods (time effect). The analysis also determines if the groups are different on a particular variable (group effect). The analysis also allows for analysis of an interaction between group and time. An interaction would be desirable if the treatment had an impact on the Take Control group, but not the Just Move group. Seven mixed model ANOVAs were conducted.

The reason the researcher choose a 2 X 3 mixed model ANOVA was that this analyses allows the researcher to examine differences between the groups and within the groups at the same time.
For the behavioral evaluation, three 2X3 mixed model ANOVAs were conducted for days of moderate physical activity, days of vigorous activity and days of total physical activity. The purpose of the 2X3 mixed model ANOVA for the measurements of physical activity was to determine: if the groups are significantly different (group effect), if the variable changed over time (time effect), and if there was an interaction effect between group and time.

For the construct validation of the treatment, four 2X3 mixed model were conducted for self-regulation, self-efficacy, social support-family, and social support-friend. Again, the purpose of the 2X3 mixed model ANOVA was to determine if the groups were significantly different (group effect), if the variable changed over time (time effect), and if there was an interaction between group and time. Figure 3.4 describes the procedure for the analysis.
Analysis Procedure:

Figure 3.4: Primary Statistical Procedure (adopted from Keppel, 1991, p. 240)
A 2X3 mixed model ANOVA was utilized to answer the following research questions.

**Primary Research Questions (Behavioral Impact Evaluation):**

1. Did days of moderate physical activity increase over the course of the study?
2. Did the Take Control intervention increase days of moderate physical activity above and beyond the Just Move intervention?
3. Did days of vigorous physical activity increase across the course of the study?
4. Did the Take Control intervention increase days of vigorous physical activity above and beyond the Just Move intervention?
5. Did days of total physical activity increase across the course of the study?
6. Did the Take Control intervention increase days of total physical activity above and beyond the Just Move intervention?

**Second Research Questions (Construct Validation of the Treatment):**

7. Did the means for self-regulation increase over the course of the study?
8. Did the Take Control intervention increase self-regulation above and beyond the Just Move intervention?
9. Did the means for self-efficacy increase over the course of the study?
10. Did the Take Control intervention increase self-efficacy above and beyond the Just Move intervention?
11. Did the means for social support-friend increase over the course of the study?
12. Did the Take Control intervention increase social support friend above and beyond the Just Move intervention?
13. Did the means social support-family increase over the course of the study?
14. Did the Take Control intervention increase social support-family above and beyond the Just Move intervention?
Process Evaluation

15. Was the Take Control intervention implemented adequately?

16. Was the Just Move intervention implemented adequately?

Hypotheses

The following null hypotheses were tested by utilizing a 2X3 mixed model ANOVA procedure described above (Figure 3.4). The following null hypotheses were tested.

Days of Moderate Physical Activity

$H_{01}$: Days of moderate physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

$H_{02}$: Days of moderate physical activity did not significantly change over the course of the intervention (time effect).

$H_{03}$: The difference in moderate activity between groups does not depend on the measurement of time (interaction).

Days of Vigorous Physical Activity

$H_{04}$: Days of vigorous physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

$H_{05}$: Days of vigorous physical activity did not significantly change over the course of the program (time effect).

$H_{06}$: The difference in vigorous activity between groups does not depend on the measurement of time (interaction).

Days of Total Physical Activity

$H_{07}$: Days of total physical activity are not significantly different between the Take Control and Just Move group (group effect).

$H_{08}$: Days of total physical activity do not significantly change over the course of the program (time effect).

$H_{09}$: The difference in days of total physical activity between groups does not depend on the measurement of time (interaction).
Self-Efficacy

Ho10: Self-efficacy means are not significantly different between the Take Control group and Just Move group (group effect).

Ho11: Self-efficacy means did not significantly change over the course of the program (time effect).

Ho12: The difference in self-efficacy between groups does not depend on the measurement of time (interaction).

Social Support - Family

Ho13: Social support-family means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho14: Social support-family means did not significantly change over the course of the program (time effect).

Ho15: The difference in social support-family between groups does not depend on the measurement of time (interaction).

Social Support - Friend

Ho16: Social support-friend means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho17: Social support-family means did not significantly change over the course of the program (time effect).

Ho18: The difference in social support-friend between groups does not depend on the measurement of time (interaction).

Self Regulation

Ho19: Self-regulation means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho20: Self-regulation means did not significantly change over the course of the program (time effect).

Ho21: The difference in self-regulation between groups does not depend on the measurement of time (interaction).
**Anticipated Problems: Attrition**

At the beginning of the study, it was thought that attrition was likely to be the main issue in maintaining statistical power. To improve response rates, the participants in both the Take Control group and the Just Move group received prompts via phone or email. The purpose of the prompts was to keep participants on target. Participants were asked about physical activity participation, completed homework assignments, etc. To also improve adherence rates, incentive were given to subjects periodically throughout the course of the study. In order to receive an incentive, all material to date had to be completed. Only two subjects in the Take Control group dropped out in week two. No subject in the Just Move group dropped from the study.

**Timetable**

Table 3.10 illustrates the activities to be conducted in the neighborhood program. The program was designed to allow for “rolling enrollment”, meaning that as subjects were recruited the material was distributed to subjects. Therefore not all subjects were getting the same material every week; however the order of material was consistent across subjects. Recruitment began in July of 2004. The last subject finished the program April 2005. The total duration of the study was 10 months.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Pretest</th>
<th>Intervention</th>
<th>Posttest/Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment of Take Control and Just Move Groups</td>
<td>Independent: Self-Regulation, Self-Efficacy, Social Support, Stage of Change, Dependent: Physical Activity Recall, Demographics</td>
<td><strong>Take Control</strong>&lt;br&gt;6 Lessons&lt;br&gt;Logs&lt;br&gt;Goal Setting&lt;br&gt;&lt;br&gt;<strong>Just Move Group</strong>&lt;br&gt;Just Move brochure&lt;br&gt;Exercise &amp; Your Heart brochure&lt;br&gt;Logs&lt;br&gt;Goal Setting</td>
<td>Independent: Self-Regulation, Self-Efficacy, Social Support, Stage of Change, Dependent: Physical Activity Recall</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Process Evaluation</td>
<td></td>
<td>Impact Evaluation&lt;br&gt;Construct Validity Evaluation</td>
</tr>
</tbody>
</table>

Table 3.10: Time of Events for Study
CHAPTER 4

RESULTS

Introduction

The purpose of the study was to evaluate the effectiveness of the Take Control intervention to promote days of physical activity among adults in a targeted neighborhood, as compared to a standard education intervention (Just Move). The Just Move intervention was implemented to act as a comparison group. Both programs were home-based interventions designed to increase days of moderate and vigorous activity among adults. The Take Control intervention was based on the SCT theory. Participants in the Take Control intervention received at their home, a series of self-guided worksheets that were tailored to address specific SCT constructs. Each worksheet required participants to actively engage in activities related to the targeted SCT theory construct. The Just Move intervention was a standard educational home-based physical activity program. In the Just Move intervention participants received two information-only American Heart Association brochures, “Exercise and Your Heart” and “Just Move”. The brochures discussed concepts from the Take Control intervention (See Table 3.8 and Table 3.9). However, the discussion was brief, consisting of 2-3 sentences and did not elaborate on any concept. Just Move participants were not required to act upon any material read in the either brochure. The Just Move participants did not receive any material that specifically addressed a particular SCT construct. The evaluation of the Take Control and Just Move interventions was conducted by a three-step approach. The main purpose of the study was to conduct a behavioral impact evaluation on the Take Control and Just Move interventions. A second purpose was to conduct a construct
validation of the treatment evaluation. Thirdly, a process evaluation was conducted. Both interventions were evaluated by a behavioral impact evaluation, construct validation of the treatment, and a process evaluation.

Behavioral Impact Evaluation

One of the primary objectives of study was to determine the behavioral impact of the Take Control and the Just Move intervention. All participants completed a seven-day recall at pretest(wk1), posttest(wk8), and follow-up(wk12). A 2X3 mixed model ANOVA was conducted on days of moderate physical activity, days of vigorous physical activity, and days of total physical activity. If the Take Control intervention and/or the Just Move intervention had an impact on physical activity behavior, an increase in days of physical activity should be seen from pretest to posttest.

Construct Validation of the Treatment Evaluation

The second purpose of the study was to determine the impact the interventions had on the constructs of self-regulation, self-efficacy, and social support. Construct validation of the treatment is often called “theory-testing” (Flay, 1986). The concept of “theory-testing” is to develop an intervention that is carefully designed to address specific theoretical constructs. This approach allows researchers the ability to assess the effectiveness of the intervention to change the targeted theoretical constructs (Hallam & Petosa, 2004). All participants completed a survey at pretest(wk1), posttest(wk8), and follow-up(wk12). The survey measured the constructs of self-regulation, self-efficacy, and social support. To examine construct validation of the treatment, a 2X3 mixed model ANOVA was conducted on self-efficacy, social support, and self-regulation.

Process Evaluation

The process evaluation was designed to determine if the intervention was implemented as designed. The process evaluation was conducted to minimize the possibility of a making a Type 3 error. For this study, a Type 3 error was defined as drawing conclusions from a study that has not been adequately delivered. The process evaluation
was measured in four areas: (1) costumer satisfaction survey, (2) length of time to return worksheets or questionnaires, (3) level of contact with participants and (4) degree of completeness of worksheets or exercise logs. The first area was ‘customer satisfaction of intervention’. Subjects were questioned on usefulness of various aspects (such as goal setting, exercise logs, lessons, & brochures) of the Take Control and the Just Move interventions. Length of time to return worksheets/questionnaire and level of contact with participants was tracked to assess level of delivering. Each week, the researcher tracked the extent of the contact with each participant. The range of contact was scored on a scale of 1-5.

1 = no face-to-face contact  
2= dropped off lesson with quick hello  
3= dropped off lesson with 1-2 minute conversation  
4= dropped off lesson with 3-5 minute conversation  
5= extensive conversation or meeting

Completeness of worksheets or exercise logs was tracked to assess the extent of effort put forth by the participant to complete the worksheets or exercise logs. A limitation of a home-based program is that the researcher cannot directly observe participation. To help compensate for lack of direct observation, the researcher subjectively evaluated each worksheet and exercise log for level of completeness. Each worksheet and log was scored on a scale of 0 to 5.

Sample

Pretest

At the pretest period, there were 34 subjects in the Take Control group and 28 subjects in the Just Move group. In the Take Control group, 91.2% of subjects were female
(3 males, 29 females). In the Just Move group, 73% of the subjects were female (9 males, 19 females).

**Posttest**

At the posttest period, two subjects had dropped from the Take Control group, making the Take Control sample 32. The two subjects who dropped from the Take Control group refused to be interviewed. Therefore no information, other than demographic characteristics obtained from the pretest, could be used to describe the drop-outs. The two drop-outs were husband and wife. The female was a 39 years old Caucasian, whose educational obtainment was a high-school diploma. The male was a 42 years old Caucasian, whose educational obtainment was a high-school diploma. No subject dropped from the Just Move group from pretest to posttest.

**Follow-Up**

No subject from the Just Move or from the Take Control group dropped from posttest to follow-up. The average age for the Take Control participant was 37.20 (std dev. =9.76). The average age for the Just Move participant was 39.0 (std dev. = 15.09). In the Take Control group, 34.4% of the subjects had ‘some college’ and 15.6% had a ‘college degree’. In the Just Move group, 44% of the subjects had ‘some college’ and 16% had a ‘college degree’. Roughly 81% of the participants were ‘white’ and 43% were ‘currently married’.

Table 4.1 illustrates the demographic information for the Take Control and Just Move groups...
<table>
<thead>
<tr>
<th>Take Control</th>
<th>Just Move</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDUCATION</strong></td>
<td><strong>EDUCATION</strong></td>
</tr>
<tr>
<td>High School Diploma</td>
<td>3.1%</td>
</tr>
<tr>
<td>Some College</td>
<td>34.4%</td>
</tr>
<tr>
<td>College Graduate</td>
<td>15.6%</td>
</tr>
<tr>
<td>Trade School</td>
<td>9.4%</td>
</tr>
<tr>
<td>Some Graduate School</td>
<td>18.8%</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>18.8%</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td><strong>RACE</strong></td>
</tr>
<tr>
<td>African-American</td>
<td>9.4%</td>
</tr>
<tr>
<td>White</td>
<td>81.3%</td>
</tr>
<tr>
<td>Native American</td>
<td>3.1%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3.1%</td>
</tr>
<tr>
<td>Other</td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>MARITAL STATUS</strong></td>
<td><strong>MARITAL STATUS</strong></td>
</tr>
<tr>
<td>Currently Married</td>
<td>43.8%</td>
</tr>
<tr>
<td>Divorce</td>
<td>25.0%</td>
</tr>
<tr>
<td>Separated</td>
<td>3.1%</td>
</tr>
<tr>
<td>Single</td>
<td>21.9%</td>
</tr>
<tr>
<td>Life Partner</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

Table 4.1: Demographics for Take Control and Just Move Groups
Statistical Procedures

Seven 2X3 (2 groups, 3 time periods) mixed model ANOVAs were conducted (self-regulation, self-efficacy, social support-family, social support-friends, days of moderate physical activity, days of vigorous physical activity, and days of total physical activity). The significance level was set at p<.05. Mixed model ANOVAS measure “interaction effects”, “time effects” and “group effects”. An “interaction effect” indicates that time is dependent on group or to restate there is a relationship between the group and the time measurements. The “time effect” indicates that independent of group, the variable changed across the time periods (pretest, posttest, follow-up. A “group effect” indicates that independent of time, there is a difference between the groups.

According to Table c.12 (Sample size for varying numbers of treatment level, and effect sizes) in the Hinkle, Weirsa & Jura (2003) textbook; with power set at .80, 2 treatment levels, alpha set at p<.05, sample size approximately 29 – one would be able to detect a .75 standard deviation difference between the means. In other words, for the statistical test to render a significant difference, the difference between two means has to be ¾ of the standard deviation or more.

Behavioral Impact Evaluation

One of the primary objectives of study was to determine the behavioral impact of the Take Control and the Just Move intervention. All participants completed a seven-day recall at pretest(wk1), posttest(wk8), and follow-up(wk12). A 2X3 mixed model ANOVA was conducted on days of moderate physical activity, days of vigorous physical activity, and days of total physical activity.
**Days of Moderate Physical Activity:**

The following research questions were developed for days of moderate physical activity.

17. Did days of moderate physical activity increase over the course of the study?

18. Did the Take Control intervention increase days of moderate physical activity above and beyond the Just Move intervention?

**Rates of Moderate Physical Activity:**

Means and standard deviations are illustrated in Table 4.2. The table illustrated that for both the Take Control group and the Just Move group, the means for moderate days of physical activity increased from pretest/posttest, and then fell from posttest/follow-up. Again, based the sample size, the statistical test was able to detect a significant difference of ¾ a standard deviation or more. For example, for the Take Control group, the pretest mean for days of moderate physical activity is 2.12 (SD = 1.93). Seventy-five percentage (or ¾) of a standard deviation of 1.93 is 1.45. If you add 1.45 to the pretest mean of 2.12 = 3.57. The posttest mean for the Take Control group is 3.90. The posttest mean of 3.90 is larger than ¾ of the pretest standard deviation (1.93) [3.57], thus it is significant.

The measurement is “days” of physical activity. To be considered a “day” of moderate activity, the participant had to participate in at least 30 minutes of continuous moderate activity. At pretest, for the Take Control group, the average is 2 days/week of moderate activity. At posttest, the mean significantly increased to 4 days/week of moderate activity (p<.05). At follow-up, the participants fall to about 3 days/week of moderate activity. The difference between posttest and follow-up was not significant (p>.05). For the Just Move group, the average days per week at pretest, was 2 days/week of moderate activity. At posttest, the mean significantly increased to about 4 days per week (p<.05). At follow-up the average participant engaged in about 3 days/week of moderate activity. The difference between posttest and follow-up is not significant (p>.05).
<table>
<thead>
<tr>
<th>Days of Moderate Physical Activity</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>2.12</td>
<td>3.90</td>
</tr>
<tr>
<td></td>
<td>(1.93)</td>
<td>(1.51)</td>
</tr>
</tbody>
</table>

Table 4.2: Means and Standard Deviations at Pretest, Posttest, and Follow-Up for Days of Moderate Physical Activity

Analysis of Hypotheses

The statistical procedure described below was designed to test to following hypotheses.

Ho1: Days of moderate physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

Ho2: Days of moderate physical activity did not significantly change over the course of the intervention (time effect)

Ho3: The difference in days of moderate activity between groups does not depend on the measurement of time (interaction).

A 2X3 mixed model ANOVA (2 groups, 3 time frames) was conducted on days of moderate activity. There are three parts to this analysis: Interaction, within-group analysis (Time Effect) and between-group analysis (Group Effect). The first step is to examine the interaction.
Within-Group Analysis (Interaction & Time Effect):

A 2X3 mixed model ANOVA was utilized for days of moderate activity. For days of moderate activity, the interaction was not significant (p>.05), therefore the main effects were utilized. The main effect for time for days of moderate activity revealed a significant time effect (p<.001). Partial eta square revealed a large effect size with high power (.998). A large effect size and high power indicate that the difference found in the mixed model ANOVA is truly a difference. A significant time effect indicates that overall the variable of days of moderate physical activity has changed across the study. Table 4.3 illustrates the 2X3 mixed model ANOVA’s within-group analysis for days of moderate physical activity.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>57.818</td>
<td>2</td>
<td>28.909</td>
<td>13.794</td>
<td>.000</td>
<td>.192</td>
<td>.998</td>
</tr>
<tr>
<td>Time*group</td>
<td>4.618</td>
<td>2</td>
<td>2.309</td>
<td>1.102</td>
<td>.336</td>
<td>.019</td>
<td>.240</td>
</tr>
<tr>
<td>Error</td>
<td>243.104</td>
<td>116</td>
<td>2.096</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3: Mixed Model ANOVA Within-Group Analysis for Days of Moderate Activity

Since there was a significant time effect, post hoc analysis were conducted to determine if there was a significant difference between any of the time frames. Posthoc analysis revealed a significant difference between pretest and posttest (mean difference a marginal difference = -1.391, p<.001) and between posttest and follow-up (mean difference = .734, p<.05).

Between-Group Analysis (Group Effect):

A 2X3 mixed model ANOVA was conducted on days of moderate activity. The between-group analysis revealed a non-significant group effect (p>.05)(Table 4.4). The analysis revealed a small effect size and low power, which is not surprising since it is a non-significant group effect. A non-significant group effect indicates that overall the groups are not significant different on days of moderate physical activity. The mixed model ANOVA
between-group analysis revealed a non-significant test (p>.05), therefore no posthoc analysis were conducted.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1475.838</td>
<td>1</td>
<td>1475.838</td>
<td>307.092</td>
<td>.000</td>
<td>.841</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Group</strong></td>
<td>2.572</td>
<td>1</td>
<td>2.572</td>
<td>.535</td>
<td>.090</td>
<td>.009</td>
<td>.111</td>
</tr>
<tr>
<td>Error</td>
<td>278.740</td>
<td>58</td>
<td>4.806</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4: Mixed Model ANOVA Between-Group Analysis for Days of Moderate Activity
Figure 4.1: Plot of the Means for Days of Moderate Physical Activity
Conclusions:

The following hypotheses were tested:

**Ho1:** Days of moderate physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

**Ho2:** Days of moderate physical activity did not significantly change over the course of the program (time effect)

**Ho3:** The difference in days of moderate activity between groups does not depend on the measurement of time (interaction).

Based on Table 4.3, Ho2 was rejected and Ho3 failed to be rejected. Posthoc analyses revealed that the biggest difference was between pretest and posttest. Table 4.2 reveals that both the Take Control and the Just Move group increased days of moderate physical activity from 2 days per week at pretest to 4 days posttest.

Based on Table 4.4, Ho1 failed to be rejected. These tables indicate that there is no significant difference (p>.05) between the Take Control group and the Just Move group for days of moderate activity.

**Days of Vigorous Physical Activity**

The following research questions were developed for days of vigorous physical activity.

19. Did days of vigorous physical activity increase across the course of the study?

20. Did the Take Control intervention increase days of vigorous physical activity above and beyond the Just Move intervention?

**Rates of Vigorous Physical Activity:**

Means and standard deviations at the pretest, posttest, and follow-up for vigorous days of activity were illustrated in Table 4.5. For the Take Control group, the trend is for the mean to decrease from pretest - posttest - follow-up. For the Just Move group, the mean
increased from pretest – posttest and then decrease from posttest – follow-up. No significant
difference was found between the groups at any time frame (p>.05).

For the Take Control group, the mean for days of vigorous activity decreased from pretest (µ=1.12) to posttest (µ=.96). The mean for the Take Control group decreases from .96 at posttest to .59 at follow-up. It should be no surprise that there was no significant
difference found between any of the time frames (p>.05). Using the ¾ standard deviation
concept, in order for the posttest mean to have been significantly different from the pretest
mean, the posttest mean would have had to 2.55 or higher. The measurement of activity is
‘day’. So from a practical sense, days per week for pretest and posttest are about 1 day and
at posttest it is less than 1 day.

For the Just Move group, the mean for days of vigorous activity significantly
increased from .59 at pretest to 1.14 at posttest (p>.05). The mean for days of vigorous
activity then decreased from 1.14 at posttest to .81 at follow-up. Again since the
measurement is ‘day’ then the amount of vigorous activity at pretest, is less then 1 day, and
at posttest the amount is about 1 day, and at follow-up, a little less than 1 day.

<table>
<thead>
<tr>
<th>Vigorous Days of Physical Activity</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>1.12</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td>(1.91)</td>
<td>(1.23)</td>
</tr>
</tbody>
</table>

Table 4.5: Means and Standard Deviations at Pretest, Posttest, and Follow-Up for Days of Vigorous Physical Activity
Analysis of Hypotheses

The statistical analysis described below was conducted to test the following hypotheses.

\( H_04: \) Days of vigorous physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

\( H_05: \) Days of vigorous physical activity did not significantly change over the course of the program (time effect).

\( H_06: \) The difference in days of vigorous activity between groups does not depend on the measurement of time (interaction).
Within Group Analysis (Interaction & Time Effect):

A 2X3 mixed model ANOVA was conducted for days of vigorous activity. Table 4.6 illustrates the 2X3 mixed model ANOVA within-group analysis.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>3.666</td>
<td>1.744</td>
<td>2.102</td>
<td>2.200</td>
<td>.123</td>
<td>.037</td>
<td>.410</td>
</tr>
<tr>
<td>Time*group</td>
<td>5.688</td>
<td>1.744</td>
<td>3.262</td>
<td>3.414</td>
<td>.043</td>
<td>.056</td>
<td>.590</td>
</tr>
<tr>
<td>Error</td>
<td>96.634</td>
<td>101.150</td>
<td>.955</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6: Mixed Model ANOVA – Within-Group Analysis for Days of Vigorous Activity

The interaction term was significant (p<.05). Figure 4.2 illustrates the means plot for days of vigorous physical activity. The interaction was a disordinal interaction. Therefore, one-way repeated measures and one-way between group ANOVAs were conducted to determine the simple effects.

One-Way Repeated Measure for the Take Control Group

A one-way repeated measures ANOVA was conducted for the Take Control group to determine if the variable changed over the course of the study. Table 4.7 revealed results from the one-way repeated measure ANOVA for the Take Control group.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>4.771</td>
<td>1.606</td>
<td>2.971</td>
<td>2.178</td>
<td>.133</td>
<td>.066</td>
<td>.381</td>
</tr>
<tr>
<td>Error</td>
<td>67.896</td>
<td>49.772</td>
<td>1.364</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7: One-Way Repeated Measures for Days of Vigorous Activity for the Take Control Group
The one-way repeated measure analysis revealed a non-significant time effect (F=2.178, p>.05) (medium effect size=.066; low power=.381). A non-significant test would also indicate the behavior of days of vigorous activity does not change significantly over the course of the study for the Take Control group.

One-Way Repeated Measure for the Just Move Group:

A one-way repeated measures ANOVA was conducted for the Just Move group to determine if days of vigorous physical activity changed over the course of study. Table 4.8 reveals results from the one-way repeated measure ANOVA for days of vigorous activity for the Just Move group.

<table>
<thead>
<tr>
<th>Type</th>
<th>III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>4.595</td>
<td>2</td>
<td>2.298</td>
<td>4.317</td>
<td>.018</td>
<td>.138</td>
<td>.727</td>
</tr>
<tr>
<td>Error</td>
<td>28.738</td>
<td>54</td>
<td>.532</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.8: One-Way Repeated Measures for Days of Vigorous Activity for the Just Move Group

The one-way repeated measure ANOVA revealed a significant time effect (F=4.595, p<.05). Partial Eta Square revealed a medium effect size (.138) and the power calculation revealed that power was adequate (.727). Since there was a significant time effect, pairwise comparison post-hoc analyses were conducted on the Just Move group. A slight significant difference was found between the pretest and posttest (Mean difference = -.571, std. error=.227, α=.054). No difference was found between posttest and follow-up (Mean difference=.321, std.error=.179, p>.05) or between pretest and follow-up (Mean difference=-.250, std.error=.175, p>.05). For the Just Move group, the only difference for days of vigorous activity was between the pretest and the posttest. Between-group ANOVA’s revealed a non-significant test at posttest (p>.05) and follow-up (p>.05).
Conclusions:

The following hypotheses were tested:

**H0₄**: Days of vigorous physical activity are not significantly different between the Take Control group and the Just Move group (group effect).

**H0₅**: Days of vigorous physical activity did not significantly change over the course of the program (time effect).

**H0₆**: The difference in days of vigorous activity between groups does not depend on the measurement of time (interaction).

The mixed model ANOVA – within group analysis – revealed a significant interaction, therefore Ho₆ was rejected. The mixed model ANOVA – within group analysis also revealed a non-significant time effect (p>.05), therefore Ho₅ failed to be rejected. However there was a significant interaction. One-way ANOVA’s were conducted to determine the relationship of days of vigorous physical activity with the Take Control group and the Just Move group. The one-way repeated measure ANOVA for the Take Control group revealed a non-significant test (p>.05). Table 4.5 illustrates the means for the Take Control group for days of vigorous physical activity. At pretest the mean was slightly above 1 (mean= 1.12) day of vigorous physical activity. At posttest the mean was slightly below 1 day of vigorous activity (mean=.96) and at follow-up the mean for days of vigorous activity was .59. Although the rates for vigorous activity fall throughout the study, it was not a significant drop.

The one-way repeated measure ANOVA for the Just Move group revealed a significant time effect (p<.05). However, it should be noted that post-hoc analysis only revealed a marginal difference between pretest and posttest. For the Just Move group, the average for days of vigorous activity rose from pretest (mean=.56) to posttest (mean=1.14). According to the post-hoc tests for the one-way repeated measure ANOVA, this difference was marginally significant (α=.054). The difference between posttest/follow-up and pretest/follow-up was not significant (p>.05). Ho₄ and Ho₅ failed to be rejected because the one-way ANOVA’s revealed no difference between time or between groups.
Deletion of Cases:

Since the 2X3 mixed model revealed a significant interaction, the researcher examined the dataset for outliers as a possible explanation of the statistical results. A significant interaction indicated that “group” had a bearing on the variable (days of vigorous physical activity). Each individual subject line in the dataset was examined for days of vigorous physical activity. It was found that two subjects (#16 and #25) from the Take Control group reported engaging in vigorous physical activity for 7 days at pretest, but only 2 days at posttest. Subject #16 reported zero days of vigorous physical activity at follow-up and subject #25 reported 2 days of vigorous physical activity at follow-up. To determine the effect these two subjects had on the statistical analysis, the researcher deleted these two subjects and re-ran all statistical analysis related to days of vigorous activity. With subject #16 and #25 deleted, the pretest mean for the Take Control group is .733(1.17 std dev.); posttest mean of .900(1.24); and follow-up mean of .567(.935). There is no significant difference between any of the time frames (p>.05). The new mixed model ANOVA (with subject #16 and #25 deleted) revealed a non-significant interaction between group and days of vigorous physical activity (p>.05). This mixed model ANOVA also revealed a significant time effect for days of vigorous physical activity. This analysis varies from the original model. The original model revealed an interaction between group*days of vigorous physical activity and no time effect for days of vigorous physical activity. No group effect was found in either analysis. It appeared that subject #16 and #25 are causing the drop in days of vigorous physical activity as well as the interaction in the model. Since there was a significant time effect, one-way repeated measures were examined. Since the subjects that were deleted were from the Take Control group, one-way repeated measures results would not (and did not) vary for the Just Move group. The one-way repeated measure for the Take Control group revealed a non-significant time effect for the Take Control group (p>.05); thus no posthoc test were run.
Tables 4.9 and 4.10 reveal the output for the Mixed Model ANOVA with subjects #16 and #25 deleted.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>4.733</td>
<td>2</td>
<td>2.367</td>
<td>4.644</td>
<td>.012</td>
<td>.077</td>
<td>.773</td>
</tr>
<tr>
<td>Time*group</td>
<td>1.630</td>
<td>2</td>
<td>.815</td>
<td>1.599</td>
<td>.207</td>
<td>.028</td>
<td>.328</td>
</tr>
<tr>
<td>Error</td>
<td>57.071</td>
<td>112</td>
<td>.510</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.9: Mixed Model ANOVA – Within-Group Analysis for Days of Vigorous Physical Activity with Subjects #16 and #25 deleted

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>113.23</td>
<td>1</td>
<td>113.223</td>
<td>38.049</td>
<td>.000</td>
<td>.407</td>
<td>1.00</td>
</tr>
<tr>
<td>Group</td>
<td>.947</td>
<td>1</td>
<td>.947</td>
<td>.321</td>
<td>.573</td>
<td>.006</td>
<td>.086</td>
</tr>
<tr>
<td>Error</td>
<td>165.076</td>
<td>56</td>
<td>2.948</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.10: Mixed Model ANOVA – Between Group Analysis for Days of Vigorous Physical Activity with subjects #16 and #25 deleted
Figure 4.3: Plot of the Means for Days of Vigorous Physical Activity With 2 Subjects Deleted
Days of Total Physical Activity

The following research questions were developed for days of total physical activity.

21. Did days of total physical activity increase across the course of the study?

22. Did the Take Control intervention increase days of total physical activity above and beyond the Just Move intervention?

Rates for Days of Total Physical Activity:

Days of moderate activity and days of vigorous activity were combined to make 'days of total physical activity'. If the participant reported one day of moderate activity and/or a day of vigorous activity, then 1 day of "total activity" was entered in the database. Means and standard deviations for days of total physical activity at pretest, posttest, and follow-up are illustrated in Table 4.11. For both the Take Control group and the Just Move group, the means increase from pretest to posttest, but then decrease from posttest to follow-up.

For the Take Control group, from pretest to posttest, the mean for days of total activity significantly increased from 2.96 to 4.31 (p<.01). At follow-up, the mean decreased from 4.31 to 3.56 (p>.05).

For the Just Move group, from pretest to posttest, the mean for total bouts of physical activity increased 1.96 to 3.55 (p<.01). At follow-up the mean for days of total activity decreased to 2.85 (p>.05).

No significant difference was found between the Take Control group and the Just Move group at any time frame (p>.05).
Table 4.11: Means and Standard Deviations at Pretest, Posttest, and Follow-up for Days of Total Physical Activity per Week for Take Control Group and Just Move Group

<table>
<thead>
<tr>
<th>Days of Total Physical Activity per Week</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>2.96</td>
<td>4.31</td>
</tr>
<tr>
<td></td>
<td>(2.10)</td>
<td>(1.37)</td>
</tr>
</tbody>
</table>
Figure 4.4: Plot of the Means for Days of Total Physical Activity

Analysis of Hypotheses:

The statistical procedure described below was conducted to test the following hypothesis:

Ho7: Days of total physical activity are not significantly different between the Take Control and Just Move group (group effect).

Ho8: Days of total physical activity do not significantly change over the course of the program (time effect).

Ho9: The difference in days of total physical activity between groups does not depend on the measurement of time (interaction).
Within-Group Analysis (Interaction & Time Effect):

A 2X3 mixed model ANOVA was conducted on days of total physical activity. The within-group analysis revealed a non-significant interaction (p>.05). Since the interaction is non-significant, the main effects can be utilized. The main effects for days of total physical revealed a significant time effect (p<.001), with a large effect size (.190) and high power (.995). Table 4.12 revealed the results from the 2X3 mixed model ANOVA, within-group analysis.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>68.272</td>
<td>1.769</td>
<td>38.594</td>
<td>13.605</td>
<td>.000</td>
<td>.190</td>
<td>.995</td>
</tr>
<tr>
<td>Time*group</td>
<td>1.405</td>
<td>1.769</td>
<td>.794</td>
<td>.280</td>
<td>.729</td>
<td>.005</td>
<td>.091</td>
</tr>
<tr>
<td>Error</td>
<td>291.051</td>
<td>102.599</td>
<td>2.837</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12: Mixed Model ANOVA – Within-Group Analysis for Days of Total Physical Activity

Between-Group Analysis (Group Effect):

A 2X3 mixed model ANOVA was conducted for days of total physical activity. The mixed model ANOVA between-group analysis revealed a significant group effect (p<.05). Table 4.13 illustrates the results from the 2X3 mixed model, between-group analysis for days of total physical activity.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1835.179</td>
<td>1</td>
<td>1835.179</td>
<td>358.52</td>
<td>.000</td>
<td>.861</td>
<td>1.000</td>
</tr>
<tr>
<td>Group</td>
<td>30.779</td>
<td>1</td>
<td>30.779</td>
<td>6.013</td>
<td>.017</td>
<td>.094</td>
<td>.674</td>
</tr>
<tr>
<td>Error</td>
<td>296.882</td>
<td>58</td>
<td>5.119</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.13: Mixed Model ANOVA - Between-Group Analysis for Days of Total Physical Activity

Since there was a significant group effect and time effect, one-way repeated measures were conducted to determine simple effects.
One-Way Repeated Measure for the Take Control Group:

A one-way repeated measures ANOVA was conducted for the Take Control group to determine if bouts of total activity changed over the course of the study. Table 4.14 illustrates the results from the one-way repeated measures ANOVA of days of total physical activity for the Take Control group.

<table>
<thead>
<tr>
<th>Type 3</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>29.021</td>
<td>2</td>
<td>14.510</td>
<td>5.659</td>
<td>.006</td>
<td>.154</td>
<td>.845</td>
</tr>
<tr>
<td>Error</td>
<td>158.979</td>
<td>62</td>
<td>2.564</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.14: One-Way Repeated Measures for Days of Total Physical Activity for the Take Control Group

The one-way repeated measure analysis revealed a significant time effect (p<.01). Partial eta square revealed a large effect size (.154) with adequate power (.845). Post-hoc pairwise comparisons were utilized to determine at what time frame, the difference occurred. There was a significant difference between pretest and posttest (Mean difference=-1.344, std error=.423, p<.01). There was not a significant difference between posttest and follow-up (Mean difference=.750, std error=.318, p>.05); nor between pretest and follow-up (Mean difference=-.594, std error=.449, p>.05).

In conclusion, for the Take Control group, there was a significant difference between pretest/posttest for days of total activity. However, there was no difference between posttest/follow-up or between pretest/follow-up.
One-Way Repeated Measure for the Just Move Group:

A one-way repeated measures analysis was conducted for the Just Move group to determine differences between pretest/posttest, posttest/follow-up, and pretest/follow-up for days of total activity. Table 4.15 illustrates results from the one-way repeated measure ANOVA for days of total physical activity for the Just Move group.

<table>
<thead>
<tr>
<th>Type 3 Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>39.929</td>
<td>2</td>
<td>19.964</td>
<td>8.163</td>
<td>.001</td>
<td>.232</td>
</tr>
<tr>
<td>Error</td>
<td>132.071</td>
<td>54</td>
<td>2.446</td>
<td>.001</td>
<td>.232</td>
<td>.950</td>
</tr>
</tbody>
</table>

Table 4.15: One-Way Repeated Measures for Days of Total Physical Activity for the Just Move Group

The within-group analysis revealed a significant time effect (p<.01). Partial eta square revealed a large effect size (.232), with adequate power (.950). Post-hoc pairwise comparisons were utilized to determine at what time frame, the difference occurred. There was a significant difference between pretest and posttest (Mean difference=-1.679, std. error=.460, p<.01). There was no difference between posttest and follow-up (Mean difference=.679, std. error=.337, p>.05); nor between pretest and follow-up (Mean difference=-1.000, std. error=.445, p>.05).

Since the mixed model ANOVA revealed a significant group effect. One-way between-group ANOVA’s were conducted to determine at what time period the groups differed. The One-Way ANOVA revealed no difference between the Take Control and the Just Move group for bouts of total activity at posttest [F(1,59)=2.941; p>.05] nor at follow-up [F(1,59)=2.128, p>.05].

In this situation, the mixed model ANOVA revealed a significant group effect. However when the data was further analyzed to determine at what time point the groups
differed, the one-way between-group ANOVAs revealed a non-significant test. This would indicate that overall – the groups are different, but not at any one specific time period.

Conclusions: The following hypotheses were tested:

$H_0_7$: Days of total physical activity are not significantly different between the Take Control and Just Move group (group effect).

$H_0_8$: Days of total physical activity do not significantly change over the course of the program (time effect).

$H_0_9$: The difference in days of total physical activity between groups does not depend on the measurement of time (interaction).

The mixed model ANOVA revealed a significant group effect ($p<.05$). Based on Table 4.13 $H_0_7$ was rejected. The analysis revealed a non-significant interaction effect, thus $H_0_9$ failed to be rejected. The mixed model ANOVA revealed a significant time effect for Days of Total Physical Activity ($p<.001$). Therefore $H_0_8$ was rejected. Posthoc analysis revealed a significant change between pretest (mean=2.96) and posttest (mean=4.31) for days of total activity for the Take Control group ($p<.01$). There was no significant difference between posttest/follow-up or between pretest/follow-up ($p>.05$) for the Take Control group. The one-way repeated measure for the Just Move group revealed a significant time effect ($p>.05$). Posthoc analysis revealed a significant difference between pretest (mean=1.96) and posttest (mean=3.55). There was no significant difference between posttest/follow-up and pretest/follow-up for days of total physical activity for the Just Move group.
Construct Validation of the Treatment

Self-Efficacy:

Research questions were developed for self-efficacy.

23. Did the self-efficacy means increase over the course of the study?

24. Did the Take Control intervention increase self-efficacy above and beyond the Just Move intervention?

Descriptive Statistics:

Self-efficacy measures the confidence an individual has in overcoming barriers to physical activity. Self-efficacy consisted of 14 questions in which participant’s were to rank on a scale of 0 (positively could not exercise) to 100% (positively could exercise) their confidence to overcome specific barriers. The scores range from 0 to 1400. A score of 1400 means that the person was 100% confident that they can overcome all the 14 stated barriers.

Table 4.16 illustrates the means and standard deviation for Self-Efficacy at pretest, posttest, and follow-up for the Take Control group and the Just Move group. There was no significant difference between the groups at any time frame (p>.05).

For the Take Control group the pretest mean for self-efficacy was 865.91. A mean of 865.91 was the equivalent of the average participant answering that they were 62% confident to all 14 questions. The posttest mean was 909.53 and the follow-up mean was 902.97, both these means which would be about a 65% confidence to all fourteen questions. There was not a significant difference between any time frame (p>.05). For the Take Control group, the average response for self-efficacy increased from 62% confidence to 65% confidence from pretest to posttest. Considering that a ¾ standard deviation is needed for significance, for the posttest mean to be significant it would have had to be 1059.81 or more. A mean of 1059.81 would be equivalent to the average participants responding with a 75% confidence rating.
The increase would have to be 62% overall confidence at pretest to 75% overall confidence at posttest in order to be significant.

For the Just Move group, the pretest mean was 866.76, which would be about a 65% overall response score for self-efficacy. The posttest means for the Just Move group was 790.19 which is about an average response of 57% confidence. The follow-up mean for self-efficacy was 753.33, which equates to about an average response of 54% confidence. There was not a significant difference between any time frame (p>.05). For the Just Move group the average response decrease from a 65% at pretest, to 57% at posttest, to 54% at follow-up.

<table>
<thead>
<tr>
<th>Self-Efficacy</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>865.91</td>
<td>909.53</td>
</tr>
<tr>
<td></td>
<td>(258.53)</td>
<td>(205.05)</td>
</tr>
</tbody>
</table>

Table 4.16: Means and Standard Deviations at Pretest, Posttest, and Follow-Up for Self-Efficacy
Figure 4.5: Plot of the Means for Self-Efficacy
Analysis of Hypotheses:

The statistical procedure described below was conducted to test the following hypotheses:

**Ho10:** Self-efficacy means are not significantly different between the Take Control group and Just Move group (group effect).

**Ho11:** Self-efficacy means did not significantly change over the course of the program (time effect).

**Ho12:** The difference in self-efficacy between groups does not depend on the measurement of time (interaction).

**Within-Group Analysis (Interaction & Time Effect):**

A 2X3 mixed model ANOVA was conducted on self-efficacy. The within-group analysis revealed a non-significant interaction between self-efficacy and group (p<.05). Since the interaction was non-significant, the main effects were analyzed. The within-group analysis for the main effects of self-efficacy revealed a non-significant time effect (p<.05). Table 4.17 illustrates the results from the mixed model ANOVA within-subject analysis for self-efficacy.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>15521.063</td>
<td>2</td>
<td>9416.421</td>
<td>.284</td>
<td>.710</td>
<td>.005</td>
<td>.090</td>
</tr>
<tr>
<td>Time*Group</td>
<td>110293.507</td>
<td>2</td>
<td>66913.59</td>
<td>2.02</td>
<td>.146</td>
<td>.034</td>
<td>.369</td>
</tr>
<tr>
<td>Error</td>
<td>3164803.060</td>
<td>116</td>
<td>27282.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.17: Mixed Model ANOVA - Within-Group Analysis for Self-Efficacy

**Between-Group Analysis (Group Effect):**

A 2X3 mixed model ANOVA was conducted on self-efficacy. The between-group analysis revealed a non-significant group effect for self-efficacy (p>.05). A non-significant "group effect" indicates that overall, self-efficacy was not significantly different between the groups. Table 4.18 reveals the mixed model between-group analysis for self-efficacy.
Table 4.18: Mixed Model ANOVA - Between-Group Analysis for Self-Efficacy

Conclusions:

In conclusion, for the Take Control group the self-efficacy means increased 44 points from pretest to posttest and remained stable at follow-up. However, the increase from pretest to posttest was not significant. The 44 point increase is equivalent to increase from 62% to a 65% in overall confidence. To have a significant difference, the overall confidence level would have to increase from 62% at pretest to about 75% at posttest. It appears that about a 10% (195 points) increase in needed to detect a difference.

For the Just Move group, self-efficacy decreased 76 points from pretest to posttest and continued to fall from posttest to follow-up. However, this decrease was not significant from pretest to posttest or from posttest to follow-up.

It appeared that although the Take Control group showed an increase across the study, at no time were the scores on self-efficacy significantly higher in the Take Control group than the scores in the Just Move group. However, one could argue that although the difference between the Take Control group and Just Move group is not significant, the Take Control intervention may have prevented self-efficacy from decreasing.

The following hypotheses were tested:

Ho10: Self-efficacy means are not significantly different between the Take Control group and Just Move group (group effect).

Ho11: Self-efficacy means did not significantly change over the course of the program (time effect).

Ho12: The difference in self-efficacy between groups does not depend on the measurement of time (interaction).
The mixed model ANOVA revealed a non-significant group effect (p>.05). Therefore Ho10 failed to be rejected. The mixed model ANOVA revealed a non-significant interaction effect and a non-significant time effect (p>.05). This statistic indicated that overall, self-efficacy did not significantly change over the course of the study. Therefore Ho11 and Ho12 failed to be rejected. For the Take Control group, self-efficacy scores remained stabled with participant scores ranging from 62-65% confidence. In the Just Move group, the scores dropped throughout the study from 65% at pretest to 54% at follow-up. It appears that the Take Control intervention may not increase self-efficacy, but may help sustain current levels.

**Social Support – Family**

The following research questions were developed for social support – family.

25. Did the social support-friend mean increase over the course of the study?

26. Did the Take Control intervention increase social support-family above and beyond the Just Move intervention?

**Descriptive Statistics:**

Social Support consisted of 12 questions in which participants were to rank on a scale of 1 (never) to 5 (very often) support that was received from family. The possible range of scores was 12-60. A score of 12 was equivalent to a score of 1 (never) on all 12 questions. Means and standard deviations are illustrated in Table 4.19. At pretest the mean for the Take Control group was higher than the Just Move group. The Just Move group and the Take Control group illustrate a similar pattern. In both groups, the mean increased from pretest to posttest and then decreased from posttest to follow-up. However, the mean for the Just Move group drops below that of the pretest mean. At no time was the difference between the groups significant (p>.05).
<table>
<thead>
<tr>
<th>Social Support- Family</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>26.00</td>
<td>27.22</td>
</tr>
<tr>
<td></td>
<td>(9.30)</td>
<td>(9.78)</td>
</tr>
</tbody>
</table>

Table 4.19: Means and Standard Deviations at Pretest Posttest, and Follow-Up for Social Support- Family

It should be no surprise that there was no significant difference between any of the time frames (p>.05). Considering that a ¾ standard deviation is needed for significance, the posttest mean needed to be 32.98 are more.

The Just Move group produced similar results. There is no significant difference between any of the time frames (p>.05). Considering that a ¾ standard deviation is needed for significance, the posttest mean needed to be 31.91 or more.
Figure 4.6: Plot of the Means for Social Support – Family

Analysis of Hypotheses:

The statistical procedure described below was conducted to test the following hypotheses:

H0₁₃: Social support-family means are not significantly different between the Take Control group and the Just Move group (group effect).

H0₁₄: Social support-family means did not significantly change over the course of the program (time effect).

H0₁₅: The difference in social support-family between groups does not depend on the measurement of time (interaction).
Within-Group Analysis (Interaction & Time Effect):

The within-group analysis revealed a non-significant interaction (p>.05). Since the interaction was non-significant, the main effects were analyzed. The main effect for time for social support-family was not significant (p>.05). A non-significant “time effect” indicates that overall social support-family did not change over the course of the study. Table 4.20 illustrates the results from the mixed model ANOVA- within-group analysis.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>218.385</td>
<td>2</td>
<td>109.192</td>
<td>1.544</td>
<td>.218</td>
<td>.026</td>
<td>.322</td>
</tr>
<tr>
<td>Time*Group</td>
<td>60.585</td>
<td>2</td>
<td>30.292</td>
<td>.428</td>
<td>.653</td>
<td>.007</td>
<td>.118</td>
</tr>
<tr>
<td>Error</td>
<td>8205.938</td>
<td>116</td>
<td>70.741</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.20: Mixed Model ANOVA – Within-Group Analysis for Social Support Family

Between-Group Analysis (Group Effect):

The between-group analysis revealed a non-significant group effect for social support-family (p>.05). A non-significant “group effect” indicates that overall, the Take Control group and the Just Move group were not statistically different on social support-family. Table 4.21 illustrates the results from the between-group ANOVA for social support-family.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>38714.770</td>
<td>1</td>
<td>38714.770</td>
<td>936.257</td>
<td>.000</td>
<td>.942</td>
<td>1.00</td>
</tr>
<tr>
<td>Group</td>
<td>54.859</td>
<td>1</td>
<td>54.859</td>
<td>1.327</td>
<td>.254</td>
<td>.022</td>
<td>.205</td>
</tr>
<tr>
<td>Error</td>
<td>2398.333</td>
<td>58</td>
<td>41.351</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.21: Mixed Model ANOVA Between-Group Analysis for Social Support Family
Conclusions: Table 4.19 illustrates the means for Social Support-Family for both the Take Control group and the Just Move group. For both groups, the average response was about a “2 (rarely)” on all items on the scale, at pretest, posttest, and follow-up. It was no surprise that the inferential statistics did not find a difference between the Take Control or the Just Move group; nor was a difference found within either group from pretest to posttest to follow-up. It was apparent that neither the Just Move nor the Take Control intervention had an impact on the variable of Social Support-Family.

The following hypotheses were tested:

$H_{013}$: Social support-family means are not significantly different between the Take Control group and the Just Move group (group effect).

$H_{014}$: Social support-family means did not significantly change over the course of the program (time effect).

$H_{015}$: The difference in social support-family between groups does not depend on the measurement of time (interaction).

The mixed model ANOVA revealed a non-significant group effect, interaction effect and time effect ($p>.05$). Therefore $H_{013}$, $H_{014}$, and $H_{015}$ failed to be rejected.

Social Support – Friend

The following research questions were developed for social support – friend.

27. Did social support-friend means increase over the course of the study?

28. Did the Take Control intervention increase social support-friend above and beyond the Just Move intervention?

Descriptive Statistics:

Social Support consisted of 12 questions in which participants were to rank on a scale of 1 (never) to 5 (very often) support that was received from friends. The possible range of scores was 12-60.
Means and standard deviations for pretest, posttest, and follow-up for the variable of social support-friend are illustrated in Table 4.22. The means for the Take Control group were greater than the Just Move group at all three measurement times. The means for the Take Control group and for the Just Move group remain fairly stable from pretest – posttest and from posttest – follow-up. It would appear that neither the Take Control intervention nor the Just Move intervention adequately addressed the variable of social support-friend.

For the Take Control group, the mean for social support-friend was 27.00 at pretest. At posttest, the score increased by .81 to a mean of 27.81. At follow-up the mean score decreased .64 to a mean of 26.88. The scores at pretest, posttest, and follow-up were fairly stable. There is no significant difference between any of the time frames (p>.05). Considering that a ¾ standard deviation is needed for significance, the posttest mean needed to be 35.37 or more to be significant.

For the Just Move group, the pretest mean was 22.36. The mean increased by .64 to a posttest mean of 23.00. The mean then decreased .36 to a follow-up mean of 22.36. The scores at pretest, posttest, and follow-up are fairly stable. There is no significant difference between any of the time frames (p>.05). Considering that a ¾ standard deviation is needed for significance, the posttest mean needed to be 27.61 or more to be significant. It is apparent that neither the Take Control intervention nor the Just Move intervention had an impact of social support-friends.

There was a significant difference between the Take Control group and the Just Move group at posttest and follow-up. At posttest, the Take Control group mean of 27.81 is significantly higher than the Just Move group mean of 23.00 (p<.05). The analysis revealed that about a 4 point difference is needed for statistical significance. However, from a practical sense 4 points is not significant.
<table>
<thead>
<tr>
<th>Social Support-Friend</th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Mean</td>
<td>27.00 (11.16)</td>
<td>22.36 (7.00)</td>
</tr>
<tr>
<td>Posttest Mean</td>
<td>27.81 (10.60)</td>
<td>23.00 (5.91)</td>
</tr>
<tr>
<td>Follow Up Mean</td>
<td>26.88 (9.04)</td>
<td>22.36 (5.77)</td>
</tr>
</tbody>
</table>

Table 4.22: Means and Standard Deviations at Pretest, Posttest, and Follow-Up for Social Support – Friend

Means for Social Support Friend

![Plot of Means for Social Support-Friends](image_url)

Figure 4.7: Plot of Means for Social Support-Friends
Analysis of Hypotheses:

The statistical procedure described below was conducted to test the following hypotheses:

Ho16: Social support-friend means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho17: Social support-friend means did not significantly change over the course of the program (time effect).

Ho18: The difference in social support-friend between groups does not depend on the measurement of time (interaction).

Within-Group Analysis (Interaction & Time Effect):

The within-group analysis revealed a non-significant interaction between group and social support-friends (p>.05). The main effects for social support-friends revealed a non-significant time effect (p>.05). A non-significant “time effect” indicates that social support-friend did not change over the course of the program. Table 4.23 reveals the mixed model ANOVA, within-group ANOVA for social support-friend.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>29.450</td>
<td>1.652</td>
<td>17.825</td>
<td>.355</td>
<td>.661</td>
<td>.006</td>
<td>.101</td>
</tr>
<tr>
<td>Time*Group</td>
<td>.072</td>
<td>1.652</td>
<td>.044</td>
<td>.001</td>
<td>.957</td>
<td>.000</td>
<td>.050</td>
</tr>
<tr>
<td>Error</td>
<td>4807.583</td>
<td>95.826</td>
<td>50.170</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.23: Mixed Model ANOVA – Within-Subject Analysis for Social Support-Friend

Between-Group Analysis (Group Effect):

The between-group analysis revealed a significant group effect for social support-friend(p<.01), indicating that overall the Take Control group and the Just Move group were statistically different. Since there was a significant group effect, one-way between-group ANOVA’s were conducted. Table 4.24 illustrates the results from the mixed model ANOVA, between-group analysis for social support.
Table 4.24: Mixed Model ANOVA Between-Group Analysis for Social Support Friends

One-way between-group ANOVA’s revealed that a statistical difference was found for social support-friend at posttest \([F(1,59)= 4.213, p<.05]\). This indicates that at posttest, the Take Control group and the Just Move group were different. Looking back at Table 4.25, this would reveal that the Take Control group mean of 27.81 is significantly higher than the Just Move group mean of 23.00.

Table 4.25: One-Way Between-Group ANOVA for Social Support-Friend at Posttest

Conclusion:

Ho₁₆: Social support-friend means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho₁₇: Social support-friend means did not significantly change over the course of the program (time effect).

Ho₁₈: The difference in social support-friend between groups does not depend on the measurement of time (interaction).
The Take Control group had higher Social Support-Friend scores than the Just Move group at pretest, posttest, and follow-up. The difference between the groups at pretest was 4.64 points and at follow-up the difference was 4.52. The difference between the groups at pretest was not significant (p>.05). The difference between the groups at posttest was 4.81 points. According to the between-group ANOVA, this difference is significant. The difference between 4.64 (pretest difference) and 4.81 (posttest difference) is .17 points. This slight .17 difference made the difference between being significant and not being significant. Considering that a ¾ standard deviation is needed for significance, the difference between Take Control posttest and the Just Move posttest is slightly more than ¾ a standard deviation, thus statistically it would be significant.

The mixed model between-group ANOVA revealed a significant group effect. This indicates that overall the Take Control group and the Just Move group are significantly different on the variable social support-friend. Thus Ho16 was rejected. A one-way between-group ANOVA revealed that the difference between the groups occurred at posttest (p<.05). The mixed model within-group ANOVA for Social Support-Friend revealed a non-significant interaction effect and a non-significant time effect indicating that Social Support-Friend did not significantly change over the course of the study. Thus Ho17 and Ho18 failed to be rejected.
Self-Regulation

The following research questions were developed for self-regulation.

29. Did the self-regulation scores increase over the course of the study?

30. Did the Take Control intervention increase self-regulation above and beyond the Just Move intervention?

Descriptive Statistics:

Self-regulation consisted of 52 questions that were scored on a scale of 1 (never) to 5 (very often). Participants were to score their use of self-regulation skills. The possible range of scores for self-regulation was from 52-260.

Table 4.26 describes the means and standard deviations of the Self-Regulation instrument at pretest, posttest, and follow-up. There was a significant difference between pretest/posttest (p<.001) and between pretest/follow-up (p<.001) for the Take Control group.

For the Just Move group, the pretest self-regulation mean of 110.52, the posttest mean of 116.00, and the follow-up mean of 122.07. There was no significant difference between any of the time frames for the Just Move group (p>.05). Considering that ¾ of a standard deviation is needed for significance, the posttest mean would have to 134.72 or higher.

At all three time periods (Pretest, Posttest, and Follow-Up), the scores for the Take Control group were higher than the Just Move group. There is a significant difference between the groups at posttest and follow-up (p<.05). The Take Control group and the Just Move group illustrated the same pattern from pretest to posttest. Scores for self-regulation increased from pretest to posttest and then continued to increase from posttest to follow-up.
Table 4.26: Means and Standard Deviations at Pretest, Posttest, and Follow-Up for Self-Regulation

<table>
<thead>
<tr>
<th></th>
<th>Take Control Group</th>
<th>Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>113.03 (37.86)</td>
<td>142.59 (33.54)</td>
</tr>
</tbody>
</table>

Figure 4.8: Plot of the Means for Self-Regulation

Figure 4.8: Plot of the Means for Self-Regulation
Analysis of Hypotheses:

The statistical procedure describe below was conducted to test the following hypotheses:

Ho_{19}: Self-regulation means are not significantly different between the Take Control group and the Just Move group (group effect).

Ho_{20}: Self-regulation means did not significantly change over the course of the program (time effect).

Ho_{21}: The difference in self-regulation between groups does not depend on the measurement of time (interaction).

Within-Group Analysis (Interaction & Time Effect):

A 2X3 mixed model ANOVA was conducted for self-regulation. The within-group analysis revealed a non-significant interaction (p>.05). Since the interaction was non-significant (p>.05), the main effects were assessed. The results from the within-group analysis for the self-regulation main effects, reveals a significant “time effect” (p<.001); with a large effect size (.196) and high power (.998). Table 4.27 illustrates the mixed model ANOVA, within-group analysis for self-regulation.

| Source Type 3 Type 3 Sums of Square Df Mean Square F Signif Partial Eta Square Observed Power |
|--------------------------|--------------------------|----------|--------------------------|--------------------------|--------------------------|
| Time                    | 20018.394                | 2        | 10009.197                | 14.125                   | .000                     | .196                     | .998                     |
| Time*Group              | 3301.772                 | 2        | 1650.886                 | 2.330                    | .102                     | .039                     | .464                     |
| Error                   | 82200.628                | 116      | 708.626                 |                          |                          |                          |                          |

Table 4.27: Mixed Model ANOVA – Within-Group Analysis for Self-Regulation
**Between-Group Analysis (Group Effect)**

A 2X3 mixed model ANOVA was conducted for self-regulation. The between-group analysis revealed a significant group effect (p<.05) (Table 4.28), with a medium effect size (.078).

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sums of Square</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2813148.734</td>
<td>1</td>
<td>2813148.734</td>
<td>1035.049</td>
<td>.000</td>
<td>.947</td>
<td>1.00</td>
</tr>
<tr>
<td>Group</td>
<td>13261.889</td>
<td>1</td>
<td>13261.889</td>
<td>4.879</td>
<td>.031</td>
<td>.078</td>
<td>.584</td>
</tr>
<tr>
<td>Error</td>
<td>157637.577</td>
<td>58</td>
<td>2717.889</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.28: Mixed Model ANOVA - Between-Group Analysis for Self-Regulation

Since there was a significant “group effect” and “time effect”, post-hoc one-way between-group analysis were conducted to determine at what time frame the group difference occurred.

The one-way between-group ANOVA revealed a statistical difference was found for self-regulation at posttest [F(1,58)= 5.933, p<.05] (Table 4.29). There was also a significant group difference at follow-up [F(1, 58) = 5.483, p<.05] (Table 4.30).

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>8237.536</td>
<td>1</td>
<td>8237.536</td>
<td>5.933</td>
</tr>
<tr>
<td>Within Groups</td>
<td>80526.397</td>
<td>58</td>
<td>1388.386</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.29: One-Way Between-Group ANOVA for Self-Regulation at Posttest
Table 4.30: One-Way Between-Group ANOVA for Self-Regulation at Follow-Up

Because there was a significant group effect, one-way repeated measure ANOVA’s were conducted to determine if there was a significant difference between any time frames for each group.

One-Way Repeated Measures for the Take Control Group:

A one-way repeated measures analysis was conducted for the Take Control group to determine difference between pretest/posttest, posttest/follow-up, and pretest/follow-up for self-regulation. Table 4.31 illustrates the one-way within-group repeated measure ANOVA for self-regulation for the Take Control group.

Table 4.31: One-Way Repeated Measures for Self-Regulation for the Take Control Group

The one-way repeated measure revealed a significant time effect ($F=13.810, p<.001$) for self-regulation for the Take Control group. A significant time effect indicates that self-
regulation significantly changed over the course of the study. Partial Eta Square revealed a large effect size (.308) and the power calculation revealed adequate power (.991).

Since there was a significant time effect, post-hoc analyses were conducted to determine between which time period(s) did the change occurred. There was a significant difference between the pretest and the posttest (Mean difference = -29.563, std error=5.201, p<.001) and pretest and follow-up (Mean difference = -33.031, std. error= 8.326, p<.001). However, there is not a significant difference between posttest and follow-up (Mean difference = -3.469, std error=6.839, p>.05).

One-Way Repeated Measures for the Just Move Group:

A one-way repeated measures analysis was conducted for the Just Move group to determine differences between pretest/posttest, posttest/follow-up, and pretest/follow-up for self-regulation. Table 4.32 illustrates the one-way within-group repeated measures for Self-Regulation for the Just Move Group.

<table>
<thead>
<tr>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif</th>
<th>Partial Eta Square</th>
<th>Observed Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>3410.310</td>
<td>2</td>
<td>1705.155</td>
<td>2.641</td>
<td>.080</td>
<td>.089</td>
</tr>
<tr>
<td>Error</td>
<td>34862.357</td>
<td>54</td>
<td>645.599</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.32: One-Way Repeated Measures for Self-Regulation for the Just Move Group

The one-way repeated measure analysis revealed a non-significant time effect for the Just Move group (F=2.641, p>05) (effect size=.060; power=.332). A non-significant time effect indicates that overall, self-regulation did not change for the Just Move group. Since there was not a significant time effect for the Just Move group, further post-hoc analyses were not conducted.
**Conclusion:** Comparing the results from the Take Control and the Just Move groups; it appears the Take Control intervention had a greater impact on self-regulation than the Just Move intervention. For the Take Control group at pretest, the mean was 113. At posttest, the Take Control self-regulation mean rose 29 points to 142, and continued to rise at follow-up to a mean of 146. It appears that about a 30 point overall difference is needed for significance. For the Take Control group, the difference between the pretest/posttest and between pretest/follow-up was significant. Although the difference between posttest/follow-up was not significant the results have a practical significance. For the Take Control group, self-regulation continued to rise even after implementation of the program has ceased. For the Just Move group, at pretest the mean was 110, at posttest the mean was 116, and at follow-up the mean for self-regulation was 122. There was not a significant difference between any of the time frames for the Just Move group. However, self-regulation continued to rise in the Just Move group, even after implementation of the program ceased.

The following hypotheses were tested:

*H₀₁₉:* Self-regulation means are not significantly different between the Take Control group and the Just Move group (group effect).

*H₀₂₀:* Self-regulation means did not significantly change over the course of the program (time effect).

*H₀₂₁:* The difference in self-regulation between groups does not depend on the measurement of time (interaction).

The test revealed a significant group effect. A significant “group effect” indicates that overall the Take Control group and the Just Move group were statistically different. One-way between-group ANOVA’s revealed a significant difference between the groups at posttest and follow-up. Based on these results, *H₀₁₉* was rejected.

Table 4.27 revealed that the mixed model within-group ANOVA revealed a significant time effect, which indicates that overall self-regulation changed over the course of the study. *H₀₂₀* was rejected. There was a non-significant interaction, thus *H₀₂₁* failed to be rejected.
The one-way repeated measure ANOVA for the Take Control group revealed a significant time effect. This indicated that self-regulation changed over the course of the study for the Take Control group. Post-hoc analysis revealed the difference occurred at posttest and follow-up. The one-way repeated measure for Self-Regulation for the Just Move group revealed a non-significant time effect. A non-significant “time effect” indicates that self-regulation did not significantly change over the course of the study for the Just Move group.

**Process Evaluation**

The purpose of the process evaluation was to evaluate degree of implementation of the program and to determine how well subjects enjoyed various aspects of the program. The process evaluation examined the implementation fidelity of the Take Control and the Just Move interventions. The process evaluation was conducted to minimize the possibility of a making a Type 3 error. A Type 3 error occurs when conclusions are drawn from a study that has not been adequately delivered. One method of examining the process evaluation was to tracking length of turn around time for the lessons, posttest, and follow-up survey. A satisfaction survey was also distributed to participants in the Take Control group and Just Move group at the posttest time. The purpose of the satisfaction survey was to determine what elements of the program were helpful or not helpful to the participants.

**Recruitment:**

Subjects were recruited through proactive and reactive procedures. Proactive procedures included calling subjects residing in the selected community. A telephone script was read to the subjects, if the subjects wanted to be a participant of the study or wanted to know more information – then the subject was randomly assigned to a group. Four subjects in the Take Control group and three subjects in the Just Move group were recruited through
phone calls. Reactive procedures included: door-to-door flyers, newsletters, and recruiting friends and family. Subjects were then randomly assigned to the Take Control group or the Just Move group. Eight participants from the Take Control group and three participants from the Just Move group were recruited through door-to-door flyers. Twelve participants in the Take Control group and eight participants in the Just Move group were recruited through the community newsletter. Participants were also asked to recruit family and friends to be members of the study. Ten participants of the Take Control group and fourteen of the Just Move participants were recruited by a current member already a participant in the study.

**Just Move Process Evaluation:**

The Just Move group was surveyed on the use of the various techniques used throughout the program. The survey was on a scale of 1 (not useful) to 4 (very useful).

Eighty percent of the Just Move subjects found setting goals to be a ‘useful/very useful’, while 76% of participants found the weekly goals to be ‘useful/very useful’. Seventy-six percent of found the pedometer to be ‘useful/very useful’. The participants were given two educational brochures. Fifty percent of participants found the brochure – Just Move – to be ‘useful/very useful’, while 60% of participants found the Exercise and Your Heart to be ‘useful/very useful’. Table 4.33 illustrates the respondents who found the various techniques throughout the program.
Throughout the program a variety of techniques were used to help you with your physical activity program. Please indicate the usefulness of each item.

<table>
<thead>
<tr>
<th>Q</th>
<th>Mean (SD)</th>
<th>Not Useful 1</th>
<th>Some what Useful 2</th>
<th>Useful 3</th>
<th>Very Useful 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Setting weekly goals for activity</td>
<td>3.16 (.746)</td>
<td>0</td>
<td>20%</td>
<td>44%</td>
<td>36%</td>
</tr>
<tr>
<td>2. Keeping track of daily physical activity (activity log)</td>
<td>3.20 (.816)</td>
<td>0</td>
<td>24%</td>
<td>32%</td>
<td>44%</td>
</tr>
<tr>
<td>3. Keeping track of daily step with pedometer</td>
<td>3.20 (1.00)</td>
<td>8%</td>
<td>16%</td>
<td>24%</td>
<td>52%</td>
</tr>
<tr>
<td>4. Just Move – American Heart Association brochure</td>
<td>2.68 (1.02)</td>
<td>12%</td>
<td>36%</td>
<td>24%</td>
<td>28%</td>
</tr>
<tr>
<td>5. Exercise and Your Heart – American Heart Association Brochure</td>
<td>2.72 (.979)</td>
<td>12%</td>
<td>28%</td>
<td>36%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table 4.33: Percentage of Just Move Participant Respondents to the Usefulness of Program Techniques.

The Just Move group also was questioned on their satisfaction on a number of aspects of the program. The instrument was on a scale of 1 (strongly dislike) to 4 (strong). All the participants (100%) ‘like/strongly liked’ the accessibility of the staff, the flexibility of the staff, and the friendliness of the staff. Eighty-seven percent of the subject found the procedure of picking up the lesson and dropping off the lessons to be easy to use.

Participants were given the keychain, pedometer, jump rope and/or hand weights, and cash for incentives. Sixty-four percent of subjects ‘strongly disliked/dislike’ the keychain incentive. Eighty percent of participants ‘liked/strongly liked’ the pedometer; 72% of participants ‘liked/strongly like’ the jump rope/hand weight incentive; and 88% ‘liked/strongly liked’ the cash incentive. Participants were given a packet of resources. Seventy-two percent of participants ‘liked/strongly liked’ the introductory section; 84% ‘liked/strongly liked’ the type of fitness section; 85% ‘liked/strongly liked’ recommendations of fitness; 84% ‘liked/strongly liked’...
liked’ the weight management section; and 92% ‘liked/strongly liked’ the injury prevention section. Eighty-four percent ‘liked/strongly liked’ the community resources. Table 4.34 illustrates the percentage of respondents to the satisfaction of program aspects.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Mean (SD)</th>
<th>Strongly Disliked 1</th>
<th>Disliked 2</th>
<th>Liked 3</th>
<th>Strongly Liked 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Accessibility to Staff</td>
<td>3.52 (.509)</td>
<td>0</td>
<td>0</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>7.</td>
<td>Flexibility of Staff</td>
<td>3.60 (.50)</td>
<td>0</td>
<td>0</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>8.</td>
<td>Friendliness of Staff</td>
<td>3.52 (.714)</td>
<td>0</td>
<td>0</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>9.</td>
<td>Ease of Use of Program (Pick Up and Drop Off Routine)</td>
<td>3.32 (.853)</td>
<td>4%</td>
<td>12%</td>
<td>32%</td>
<td>52%</td>
</tr>
<tr>
<td>10.</td>
<td>Keychain Incentive</td>
<td>2.20 (.913)</td>
<td>24%</td>
<td>40%</td>
<td>28%</td>
<td>8%</td>
</tr>
<tr>
<td>11.</td>
<td>Pedometer Incentive</td>
<td>3.04 (.789)</td>
<td>4%</td>
<td>16%</td>
<td>52%</td>
<td>28%</td>
</tr>
<tr>
<td>12.</td>
<td>Jump Rope/Hand Weight Incentive</td>
<td>2.76 (.879)</td>
<td>12%</td>
<td>16%</td>
<td>56%</td>
<td>16%</td>
</tr>
<tr>
<td>13.</td>
<td>Cash Incentive</td>
<td>3.40 (.707)</td>
<td>12%</td>
<td>36%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Packet: Introductory Section</td>
<td>2.80 (.816)</td>
<td>8%</td>
<td>20%</td>
<td>56%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Packet: Educational Section</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Types of Fitness</td>
<td>3.04 (.734)</td>
<td>4%</td>
<td>12%</td>
<td>60%</td>
<td>24%</td>
</tr>
<tr>
<td>16.</td>
<td>Recommendations of Fitness</td>
<td>3.08 (.759)</td>
<td>4%</td>
<td>12%</td>
<td>56%</td>
<td>28%</td>
</tr>
<tr>
<td>17.</td>
<td>Weight Management</td>
<td>3.08 (.759)</td>
<td>4%</td>
<td>12%</td>
<td>56%</td>
<td>28%</td>
</tr>
<tr>
<td>18.</td>
<td>Injury Prevention</td>
<td>3.16 (.554)</td>
<td>0</td>
<td>8%</td>
<td>68%</td>
<td>24%</td>
</tr>
<tr>
<td>19.</td>
<td>Packet: Community Resources</td>
<td>3.04 (.734)</td>
<td>4%</td>
<td>12%</td>
<td>60%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table 4.34: Percentage of Just Move Participant Respondents to the Satisfaction of Aspects to the Program
Take Control Process Evaluation:

Participants of the Take Control Program Evaluation were surveyed on there use of the various techniques used throughout the program. The survey was on a scale of 1 (not useful) to 4 (very useful). Throughout the program, the subjects completed 6 self-guided worksheets/lessons. Participants were questioned on how useful they found each worksheet/lesson to be.

For Lesson 1, 66% subjects found the lesson to be ‘useful/very useful’. Fifty-seven percent of participants found environmental changes to be ‘useful/very useful’; and 60% of participants found pace of activity to be ‘useful/very useful’ for Lesson 2. There were two aspects to lesson 3: overcoming barriers and plan of action. Fifty-seven percent of subjects found overcoming barriers, and 60% found plan of action were ‘useful/very useful’. Lesson 4 addressed time management. Sixty-three percent of subjects found time management to be ‘useful/very useful’. Lesson 5 addresses social support (time relief, exercise buddy, and encouragement). Sixty-six percent of subjects ‘liked/strongly liked’ the exercise buddy portion of social support, 45% of subjects ‘liked/strongly liked’ the time relief portion of social support, and 45% of subjects ‘liked/strongly liked’ the exercise encouragement section of social support. Lesson 6 addressed long-term planning for adherence, exercise plan for changing seasons, and goal setting for changing seasons. Forty-five percent of subjects found long term planning to be ‘useful/very useful’; 51% of subjects of subjects found exercise plan for changing seasons to be ‘useful/very useful’; and 48% of subjects found goal setting for changing seasons to be ‘useful/very useful’. Table 4.35 illustrates the percentage of subjects who found various aspects to be useful.
<table>
<thead>
<tr>
<th>Lesson</th>
<th>Exercise Preferences:</th>
<th>Mean (SD)</th>
<th>Not Useful 1</th>
<th>Somewhat Useful 2</th>
<th>Useful 3</th>
<th>Very Useful 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Evaluation of your personal exercise preferences.</td>
<td>2.81 (.917)</td>
<td>9.1%</td>
<td>24.2%</td>
<td>42.4%</td>
<td>24.2%</td>
</tr>
<tr>
<td>2.</td>
<td>Environmental Changes: Encouraged you to alter your home (physical) environment</td>
<td>2.54 (.905)</td>
<td>15.2%</td>
<td>27.3%</td>
<td>45.5%</td>
<td>12.1%</td>
</tr>
<tr>
<td>3.</td>
<td>Pace of Activity Engaged in activity in which you progressed from a slow walk to a jog. Evaluate what pace was comfortable to you</td>
<td>2.58 (1.03)</td>
<td>21.2%</td>
<td>18.2%</td>
<td>42.4%</td>
<td>18.2%</td>
</tr>
<tr>
<td>4.</td>
<td>Overcoming Barriers Identifying barriers that prevent you from engaging in physical activity</td>
<td>2.85 (1.09)</td>
<td>12.1%</td>
<td>30.3%</td>
<td>18.2%</td>
<td>39.4%</td>
</tr>
<tr>
<td>5.</td>
<td>Plan of Action Once you had identified a barrier, you were to develop a plan of action</td>
<td>2.82 (1.04)</td>
<td>12.1%</td>
<td>27.3%</td>
<td>27.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>6.</td>
<td>Time Management Record daily activities and were to identify times and days were more convenient for fitting physical activity into your schedule</td>
<td>2.88 (.927)</td>
<td>6.1%</td>
<td>30.3%</td>
<td>33.3%</td>
<td>30.3%</td>
</tr>
<tr>
<td>7.</td>
<td>Social Support Exercise Buddy: Ask a family member of friend to exercise with you on a regular basis</td>
<td>3.06 (1.12)</td>
<td>12.1%</td>
<td>21.2%</td>
<td>15.2%</td>
<td>51.5%</td>
</tr>
<tr>
<td>8.</td>
<td>Social Support Time Relief: Ask a family member or friend to help you make time to exercise.</td>
<td>2.45 (1.23)</td>
<td>30.3%</td>
<td>24.2%</td>
<td>15.2%</td>
<td>30.3%</td>
</tr>
<tr>
<td>9.</td>
<td>Social Support Encouragement: Ask a family member or friend to give you encouragement for you to continue with your exercise program</td>
<td>2.42 (1.03)</td>
<td>21.2%</td>
<td>33.3%</td>
<td>27.3%</td>
<td>18.2%</td>
</tr>
<tr>
<td>10.</td>
<td>Long Term Planning Use of Skill in the Future: Recap of skills learn and if you would continue to use those skills</td>
<td>2.55 (1.03)</td>
<td>15.2%</td>
<td>39.4%</td>
<td>21.2%</td>
<td>24.2%</td>
</tr>
<tr>
<td>11.</td>
<td>Exercise Plan for Changing Seasons Generate ideas of activities that could be done over the four seasons</td>
<td>2.46 (1.00)</td>
<td>21.2%</td>
<td>27.3%</td>
<td>36.4%</td>
<td>15.2%</td>
</tr>
<tr>
<td>12.</td>
<td>Goal Setting for Changing Seasons Set exercise goals that were specific to the four seasons</td>
<td>2.39 (.966)</td>
<td>21.2%</td>
<td>30.3%</td>
<td>36.4%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>

Table 4.35: Percentage Subjects in the Take Control Evaluation Ranking the Usefulness of Lesson
Participants were questioned on how useful various aspects of the program were. Sixty-nine percent of found setting goals to be 'useful/very useful'; 72% of subjects found the logs to be 'useful/very useful'; 57% found the pedometer to be 'useful/very useful' and 45% found the feedback on the lesson to be 'useful/very useful'. Table 4.36 illustrates the usefulness of the goal keeping, logs, pedometer, and feedback.

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Not Useful 1</th>
<th>Somewhat Useful 2</th>
<th>Useful 3</th>
<th>Very Useful 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Setting weekly goals for activity</td>
<td>2.97 (1.04)</td>
<td>12.1%</td>
<td>18.2%</td>
<td>30.3%</td>
</tr>
<tr>
<td>14.</td>
<td>Keeping track of daily physical activity (activity log)</td>
<td>2.94 (.998)</td>
<td>12.1%</td>
<td>15.2%</td>
<td>39.4%</td>
</tr>
<tr>
<td>15.</td>
<td>Keeping track of daily step with pedometer</td>
<td>2.70 (1.10)</td>
<td>18.2%</td>
<td>24.2%</td>
<td>27.3%</td>
</tr>
<tr>
<td>16.</td>
<td>Receiving old lessons back with feedback</td>
<td>2.42 (1.20)</td>
<td>30.3%</td>
<td>24.2%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

Table 4.36: Percentage of Subjects Ranking Goal-Setting, Logs, Pedometer, and Feedback

Participants were questioned on various aspects of the program. Ninety-one percent of subject 'liked/strongly liked' the accessibility of staff; 100% of subjects 'liked/strongly liked' flexibility of staff; and 100% 'liked/strongly liked' friendliness of staff.

Participants were questioned on procedures of data collection. One hundred percent of students 'liked/strongly liked' the flexibility of the program, ease of the program, and the pickup and drop off schedule. Ninety-percent of the participants 'liked/strongly liked' the instructions to the lessons.

Participants were given a keychain, pedometer, jump rope/hand weights, and cash as incentives. Forty-eight percent of the subjects 'liked/strongly liked' the keychain incentive,
88% of subjects ‘liked/strongly liked’ the pedometer; 90% of subjects ‘liked/strongly liked’ jump rope/hand weights; and 95% ‘liked/strongly liked’ the cash incentives.

Participants received a packet of resources. Participants were questioned on their satisfaction with the packet of resources. Seventy-five percents of subjects ‘liked/strongly liked’ the introductory section. Eighty-eight percent of subjects ‘liked/strongly liked’ the type of fitness section, 91% of subjects ‘liked/strongly liked’ the recommended levels of fitness; 94% of subjects ‘liked/strongly liked’ the weight management section; and 89% ‘liked/strongly liked’ the injury prevention section. Ninety-four percent of participants ‘liked/strongly liked’ the community resource section. Table 4.37 illustrated the percentage of satisfaction on various aspects of the program.
<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Strongly Disliked</th>
<th>Disliked</th>
<th>Liked</th>
<th>Strongly Liked</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Accessibility of Staff</td>
<td>3.18 (.584)</td>
<td>0</td>
<td>9.1%</td>
<td>63.6%</td>
<td>27.3%</td>
</tr>
<tr>
<td>18. Flexibility of Staff</td>
<td>3.36 (.489)</td>
<td>0</td>
<td>0</td>
<td>63.6%</td>
<td>36.4%</td>
</tr>
<tr>
<td>19. Friendliness of Staff</td>
<td>3.56 (.502)</td>
<td>0</td>
<td>0</td>
<td>42.4%</td>
<td>57.6%</td>
</tr>
<tr>
<td>20. Flexibility of Program (Were given more time to work on a lesson if you needed it)</td>
<td>3.39 (.496)</td>
<td>0</td>
<td>0</td>
<td>60.6%</td>
<td>39.4%</td>
</tr>
<tr>
<td>21. Ease of Use of Program (Pick Up and Drop Off Routine)</td>
<td>3.51 (.507)</td>
<td>0</td>
<td>0</td>
<td>48.5%</td>
<td>51.5%</td>
</tr>
<tr>
<td>22. Pick Up and Drop Off Schedule Provided Adequate Time to Complete Each Lesson</td>
<td>3.42 (.708)</td>
<td>3.0%</td>
<td>3.0%</td>
<td>42.4%</td>
<td>51.5%</td>
</tr>
<tr>
<td>23. Instructions to lesson were understandable (You understood the instructions and knew what to do)</td>
<td>3.27 (.719)</td>
<td>3.0%</td>
<td>6.1%</td>
<td>51.5%</td>
<td>39.4%</td>
</tr>
<tr>
<td>24. Keychain Incentive</td>
<td>2.54 (1.17)</td>
<td>24.2%</td>
<td>27.3%</td>
<td>18.2%</td>
<td>30.3%</td>
</tr>
<tr>
<td>25. Pedometer Incentive</td>
<td>3.36 (.783)</td>
<td>3.0%</td>
<td>9.1%</td>
<td>36.4%</td>
<td>51.5%</td>
</tr>
<tr>
<td>26. Jump Rope/Hand Weight Incentive</td>
<td>3.27 (.801)</td>
<td>6.1%</td>
<td>3.0%</td>
<td>48.5%</td>
<td>42.4%</td>
</tr>
<tr>
<td>27. Cash Incentive</td>
<td>3.36 (.783)</td>
<td>6.1%</td>
<td>0</td>
<td>45.5%</td>
<td>48.5%</td>
</tr>
<tr>
<td>28. Packet: Introductory Section</td>
<td>2.97 (.984)</td>
<td>12.1%</td>
<td>12.1%</td>
<td>42.4%</td>
<td>33.3%</td>
</tr>
<tr>
<td>29. Packet: Educational Section</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29a Types of Fitness</td>
<td>3.03 (.728)</td>
<td>6.1%</td>
<td>6.1%</td>
<td>66.7%</td>
<td>21.2%</td>
</tr>
<tr>
<td>29b Recommendations of Fitness</td>
<td>3.15 (.667)</td>
<td>3.0%</td>
<td>6.1%</td>
<td>63.6%</td>
<td>27.3%</td>
</tr>
<tr>
<td>29c Weight Management</td>
<td>3.27 (.674)</td>
<td>3.0%</td>
<td>3.0%</td>
<td>57.6%</td>
<td>36.4%</td>
</tr>
<tr>
<td>29d Injury Prevention</td>
<td>3.09 (.631)</td>
<td>3.0%</td>
<td>6.1%</td>
<td>69.7%</td>
<td>21.2%</td>
</tr>
<tr>
<td>30. Packet: Community Resources</td>
<td>3.15 (.619)</td>
<td>3.0%</td>
<td>3.0%</td>
<td>69.7%</td>
<td>24.2%</td>
</tr>
</tbody>
</table>

Table 4.37: Percentage of Satisfaction for Aspects in the Take Control Program
Length of Time to Return Worksheets and Logs:

For the Take Control group, each participant was given a week to complete each lesson/worksheet. The researcher tracked the length of time (in days) it took the participants to return the lessons and surveys. For Take Control group, 25 of the 32 (78%) subjects returned Lesson 1 within 9 days; 29 out of 32 (91%) returned Lesson 2 (84%) within 9 days; 27 out of 32 (84%) returned Lesson 3 within 9 days; 19 out of 32 (59%) returned Lesson 4 within 9 days; 27 out of 32 (84%) returned Lesson 5 within 9 days; and 32 out of 32 (100%) returned Lesson 6 within 9 days. Ninety-four percent of subjects returned the posttest within 9 days and 91% of subjects returned the follow-up survey within 9 days.

Only a small number subjects turned in the lessons 15-21 days late. Table 4.38 illustrates the frequency distribution returning surveys and logs for the Take Control group.

<table>
<thead>
<tr>
<th>Lesson (n=32)</th>
<th>1-7 days</th>
<th>8-9 days</th>
<th>10-14 days</th>
<th>15-21 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1</td>
<td>18</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Lesson 2</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 3</td>
<td>22</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Lesson 4</td>
<td>18</td>
<td>1</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Lesson 5</td>
<td>22</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 6</td>
<td>27</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Post-Test</td>
<td>23</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>25</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.38: Frequency Distribution: Length of Time to Return Lesson or Surveys for Take Control Group

The Just Move group received new material at week three. At week 6, the Just Move subjects were to return the logs from week 3-6. Nineteen out of 28 subjects returned material in on time during week 3. Six subjects returned the material a week late. Fourteen subjects returned the material at week 6 on time. Seven subjects turned the material at week 6, one week late. For the posttest, 18 subjects returned the posttest on-time and 8 subjects returned
the posttest a week late. For the follow-up survey, 20 subjects returned the follow-up survey on-time, while 8 subjects returned the survey 1 week late. Table 4.39 illustrates the frequency distribution for the Just Move group.

<table>
<thead>
<tr>
<th>Frequency Distribution for the Just Move Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>On time</td>
</tr>
<tr>
<td>Week 3</td>
</tr>
<tr>
<td>Week 6</td>
</tr>
<tr>
<td>Post-Test</td>
</tr>
<tr>
<td>Follow-Up</td>
</tr>
</tbody>
</table>

Table 4.39: Length of Time to Return Logs and Surveys for Just Move Group

Face-to-Face Contact With Participants:

The extent of the face-to-face contact was monitored throughout the study. Each week, the researcher tracked the extent of the contact with each participant. The range of contact was scored on a scale of 1-5.

1 = no face-to-face contact

2= dropped off lesson with quick hello

3= dropped off lesson with 1-2 minute conversation

4= dropped off lesson with 3-5 minute conversation

5= extensive conversation or meeting

Table 4.40 illustrates the frequency counts for each face-to-face contact category that the researcher had with the Take Control participants. All posttest and follow-up surveys were dropped off at the participant’s home and picked up the following week. Lesson 1, Lesson 3 and Lesson 6 consist of critical time points in the study.
For the Take Control group, lesson 1 was at the pretest and orientation time. As expected, 25 participants (78%) had extensive contact during week 1. During week 3, participants received the pedometer. The researcher encouraged participants who had no experience with pedometers to make time for a short meeting. However, most subjects (75%) wished to have the material dropped off (contact 1 or 2), without having an extensive meeting. During week 2, 4, and week 5 the intended procedure was to drop off the lessons. At week 6, participants were given the end of program incentive (jump rope/hand weight). During week 6, participants were encouraged to meet with the researcher to receive their incentive. However, 97% of participants choose to have their incentives dropped off at the house. Table 4.61 illustrates the face-to-face frequency counts for each lesson for the Take Control group.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Contact 1</th>
<th>Contact 2</th>
<th>Contact 3</th>
<th>Contact 4</th>
<th>Contact 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1 (Pretest)</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Lesson 2</td>
<td>26</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 3 (Pedometer)</td>
<td>16</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 4</td>
<td>26</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 5</td>
<td>26</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lesson 6</td>
<td>31</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.40: Face-to-Face Frequency Counts for Each Lesson for Take Control Participants

For the Just Move group, week 1 was also the pretest and orientation time. As expected, 82% of subjects had an extensive meeting with the research at week 1. Participants who were not familiar with use of a pedometer were encouraged to meet with the researcher at week 3. Fifty percent of subjects choose to have their pedometers and material to be dropped off. Thirty-two percent of subjects choose to have an extensive meeting with the researcher (contact 4 or 5). At week 6, participants received a jump rope/hand weight as an end of the program incentive. At week 6, 61% of subjects choose to have their end of
program incentives dropped off at their house. Table 4.41 illustrates the face-to-face frequency counts for the Just Move group.

<table>
<thead>
<tr>
<th>Week</th>
<th>Contact 1</th>
<th>Contact 2</th>
<th>Contact 3</th>
<th>Contact 4</th>
<th>Contact 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1 (Pretest)</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Week 3 (Pedometer)</td>
<td>14</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Week 6</td>
<td>14</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4.41: Face-to-Face Frequency Counts at Week 1, Week 3, and Week 6 for Just Move Participants

Completeness of Logs, Brochures, and Worksheets:

The researcher could not directly observe physical activity or the time participants allocated for completing the worksheets. Each worksheet and log was scored on a scale of 0 to 5.

- 0 = not completed at all
- 1 = missing several sections on worksheet or exercise log
- 2 = missing one section on worksheet or exercise log
- 3 = completed, but appeared to be 'copying' from one section to another
- 4 = completed, but finished it when being picked up
- 5 = completed as intended

Just Move Completeness of Logs and Brochures:

Eighty-three percent of Just Move participants reported reading the Just Move and the Exercise and Your Heart brochures. During the intervention (weeks 1-6), all subjects returned the exercise log. Eighty-five percent of Just Move participants received a ranking of “5 – completed as intended” for the exercise log for weeks 1-6. No participants received a ranking below “4-completed, but finished when being picked up” during weeks 1-6. During the maintenance phase (week 7-12) there is a pattern. As weeks progress more participants did not monitor their physical activity via the logs (no log was returned for that week). At week 7, 79% returned an exercise log. At week 8, 50% returned an exercise log. Weeks 9 and 10,
15% returned an exercise log. Only 1 participant returned an exercise log at week 11. No participant returned an exercise at week 12. Forty-three Just Move participants did not return all logs during the maintenance phase (week 7-12). Only 2 participants returned an exercise log past week 9.

**Take Control Completeness of Worksheets and Logs:**

For the Take Control participants, two participants turned worksheet 1 and log 1 with missing data. These worksheets and logs were returned to the participant. The participant was asked to complete all section of the worksheet/log. During week 1, 43% of the participants completed the worksheets as intended (ranking of 5). The researcher provided feedback on worksheets. After week 1, all Take Control participants completed all sections of the worksheets and logs. Take Control participants appeared to struggle with worksheets 4 and 5. Worksheet 4 (time management) and worksheet 5 (social support) are the only worksheets in which participants received a ranking of “3-completed, but seem to copying from one section to another.” In all other worksheets, all participants received a ranking of “4” or “5”. Eighty-six percent of Take Control participants completed worksheets 2, 3, and 6 as intended (ranked a 5 on the scale).

The exercise logs did not appear to give participants trouble, other than week 1, with only 56% completed the exercise logs as intended. During week 2, 78% completed the logs as intended; week 3, 84% completed the logs as intended; week 4, 72% completed the logs as intended; week 5, 84% completed the logs as intended, and week 6, 93% completed the logs as intended. Similar to the Just Move participants, once the Take Control participants entered into the maintenance phase, fewer participants returned exercise logs as the weeks passed. At week 7, 63% returned an exercise log; week 8, 63% returned an exercise log; week 9, 57% returned an exercise log; week 10, 34% returned an exercise log; week 11, 19% returned an exercise log, and week 12, 13% returned an exercise log. Sixteen percent of Take Control participants did not return exercise logs during the maintenance phase.
Approximately 58% of participants did not return an exercise log after week 8. Only 4 subjects returned exercise logs for the entire duration of the maintenance phase.

It appears from the Just Move evaluation and the Take Control evaluation, that once the intervention ended, subjects stopped monitoring their physical activity via the exercise log. Perhaps maintaining the self-monitoring behavior was not stressed enough during the maintenance phase. Even though all participants received exercise logs during the maintenance phase, perhaps since the intervention had ended, the participants no longer felt that they were required or obligated to continue monitoring their behavior.
CHAPTER 5

CONCLUSIONS & DISCUSSIONS

Introduction:

The purpose of the study was to evaluate the effectiveness of the Take Control intervention to promote days of physical activity among adults in a targeted neighborhood, as compared to a standard education intervention (Just Move). Both programs were home-based interventions designed to increase days of moderate and vigorous activity among adults. The Take Control intervention was based on the SCT theory. Participants in the Take Control intervention received at their home, a series of self-guided worksheets that were tailored to address specific SCT constructs. Each worksheet required participants to actively engage in activities related to the targeted SCT theory construct. The Just Move intervention was a standard educational home-based physical activity program. In the Just Move intervention participants received two information-only American Heart Association brochures, “Exercise and Your Heart” and “Just Move”. The brochures discussed concepts from the Take Control intervention. However, the discussion was brief, consisting of 2-3 sentences and did not elaborate on any concept. Just Move participants were not required to act upon any material read in the either brochure. The Just Move participants did not receive any material that specifically addressed a particular SCT construct.
Evaluation Techniques:

The evaluation of the Take Control and Just Move interventions was conducted by three levels of evaluation: behavioral impact evaluation, construct validation evaluation, and process evaluation. The main purpose of the study was to conduct a behavioral impact evaluation for the Take Control and Just Move interventions. All participants completed a seven-day recall of physical activity at pretest (wk1), posttest (wk8), and follow-up (wk12). If the Take Control and/or the Just Move interventions were successful at increasing days of physical activity, then an increase should be seen from pretest to posttest. In essence, one is measuring the effectiveness of the intervention to increase days of physical activity. To determine the level of change in physical activity, a 2X3 mixed model ANOVA was conducted on days of moderate physical activity, days of vigorous physical activity, and total days of physical activity.

A second purpose of the study was to conduct a construct validation of the treatment evaluation. All participants completed a survey at pretest (wk1), posttest (wk8), and follow-up (wk12). The survey measured the constructs of self-regulation, self-efficacy, and social support. In construct validation, one is interested in the impact the intervention(s) had on the targeted constructs. If the Take Control and/or the Just Move interventions were successful at increasing any of the targeted SCT constructs, then an increase in self-regulation, social support, and self-efficacy should be seen from pretest to posttest. To examine construct validation of the treatment, a 2X3 mixed model ANOVA was conducted on self-efficacy, social support, and self-regulation.

Thirdly, a process evaluation was conducted. The process evaluation was designed to determine if both interventions were implemented adequately. The process evaluation was measured in four areas: (1) costumer satisfaction survey, (2) length of time to return worksheets/surveys, (3) level of contact with participants and (4) completeness of worksheets or exercise logs. The first area was ‘customer satisfaction of intervention’. Subjects were questioned on usefulness of various aspects (such as goal setting, exercise
logs, lessons, & brochures) of the Take Control and the Just Move interventions. Length of
time to return worksheets/surveys and level of contact with participants was tracked to
assess level of delivering. Each week, the researcher tracked the extent of the contact with
each participant. The range of contact was scored on a scale of 1 (no contact) -5 (extensive
contact).

Completeness of worksheets or exercise logs was tracked to assess the extent of
effort put forth by the participant to complete the worksheets or exercise logs. A limitation of
a home-based program is that the researcher cannot directly observe participation. To help
compensate for lack of direct observation, the researcher subjectively evaluated each
worksheet and exercise log for level of completeness. Each worksheet and log was scored
on a scale of 0 (not complete at all) to 5 (completed as intended).

This chapter is divided into several sections: The first section, behavioral impact
evaluation, examines the impact the Take Control intervention and Just Move interventions
had on days of physical activity. The second section, construct validation of the treatment,
examines the impact the two interventions had on the SCT constructs of self-regulation, self-
efficacy, social support-family and social support-friend. The third section, process
evaluation, examines the implementation of two interventions. Recommendations for change
to intervention, recommendations for future research, and limitations of the study are also
discussed.
Behavioral Impact Evaluation

Summary & Conclusions

Introduction:

The purpose of the behavioral impact evaluation was to determine behavioral changes in the Take Control group and the Just Move group. To examine the behavior impact of the Take Control and Just Move interventions: rates of moderate, vigorous, and total days of physical activity were analyzed.

Days of Moderate Physical Activity:

Research Question: Did days of moderate physical activity increase over the study?

The 2X3 mixed model ANOVA revealed a significant time effect for days of moderate physical activity. The Take Control and the Just Move interventions were successful at increasing days of moderate physical activity from 2 days at pretest to 4 days at posttest. Both groups increased days of moderate activity from 2 days at pretest to 3 days at follow-up. Increasing moderate physical activity by 1 day may have implications for health policy. Overtime, a one-day increase may reduce chronic diseases, such as heart disease and stroke. In conclusion, both interventions were successful at increasing days of moderate physical activity.

Research Question: Did the Take Control intervention increase days of moderate physical activity, above and beyond that of the Just Move intervention?

The 2X3 mixed model ANOVA revealed a non-significant group effect for days of moderate physical activity. The analysis revealed that there is no difference between the Take Control group and the Just Move group for days of moderate physical activity. To conclude, the statistical analysis would support that the Take Control group did not
significantly increase days of moderate activity above and beyond that of the Just Move intervention.

**Discussion:**

The current study revealed a time effect with a large effect size for days of moderate physical activity. Since there was a large effect size and high power, is likely that these results did not happen by chance. The large effect size is not consistent with past studies (Grim, 2003 & Hallam & Petosa, 2004). Grim (2003) and Hallam & Petosa (2004) both revealed a small effect size for days of moderate physical activity. Grim (2003) reported a $\frac{1}{4}$ standard deviation in days of moderate physical activity increase can be expected from pretest to posttest for a SCT-based intervention and Hallam & Petosa (2004) reported a $\frac{1}{6}$ standard deviation increase. The current study exceeds the expectations of past study by reporting a $\frac{1}{2}$ standard deviation increase in days of moderate physical activity for the Take Control group.

The analysis revealed a non-significant group effect. This result was consistent with past studies (Grim, 2003 & Hallam & Petosa, 2004). Grim (2003) and Hallam & Petosa (2004) both reveal a non-significant group effect for days of moderate physical activity. In the present study, a group effect was not seen because both the Take Control group and the Just Move group are increasing days of moderate activity at a similar rate. Both groups were required to monitor their physical activity via logs. Monitoring behavior could have caused both groups to increase days of moderate physical activity at a similar rate, thus no difference between the groups was seen.

In all studies [the Grim (2003), Hallam & Petosa (2004) and present study] activity level of the participants was not used as a screening technique. Therefore, participants were already engaging in some level of moderate physical activity at pretest. This error in recruitment could have lessened the impact of the intervention. Perhaps if sedentary adults would have been recruited more differences between the interventions would have been seen.
Days of Vigorous Physical Activity:

Research Question: Did days of vigorous physical activity increase over the study?

The 2X3 mixed model ANOVA revealed a significant interaction. With a significant interaction, the next step would be to examine the simple effects. The simple effect for time was not significant. The simple effects analysis for time revealed that days of vigorous physical activity did not increase over the study for the Take Control or the Just Move group. In conclusion, days of vigorous physical activity did not increase over the study.

Research Question: Did the Take Control intervention increase days of vigorous physical activity above and beyond that of the Just Move intervention?

The 2X3 mixed model ANOVA revealed a significant interaction. With a significant interaction, the next step would be to examine the simple effects. The simple effect for group was not significant. To conclude, the Take Control group did not significantly increase days of vigorous physical activity above and beyond that of the Just Move group.

Discussion:

The mixed model ANOVA revealed a significant interaction. However, upon examination of the data, outliers in the Take Control group were found. Two participants in the Take Control group reporting engaging in 7 days of moderate activity per week. The interaction was caused by these two outliers. Once removed, the interaction is non-significant. Both interventions were not successful at having a practical impact on days of vigorous physical activity. Both groups reported engaging in one day of vigorous physical activity at pretest, posttest, and follow-up.

It should be noted that although subjects were free to choose any mode of activity of their choosing and adherence to either the moderate or vigorous ACSM recommendation were encouraged – the activity that was most encouraged through the neighborhood programs was walking, which is a moderate activity. A possible explanation for the failing to
see much of a change in days of vigorous physical activity could be that participants felt that
moderate activities were more encouraged. The interventions may not have placed enough
emphasis on vigorous physical activity. Another possible explanation could that vigorous
activity is more strenuous and therefore may have been less appealing to the participants –
and thus participants may not have engaged in more vigorous physical activity regardless of
mode of activity emphasized. In conclusion, it appears that neither the Take Control
intervention nor the Just Move intervention had a practical significant impact on days of
vigorous physical activity.

Days of Total Physical Activity:

*Research Question: Did days of total physical activity increase over the study?*

The 2X3 mixed model ANOVA revealed a significant time effect for days of total
physical activity. The Take Control intervention significantly increased total bouts of activity
from 3 days at pretest to 4 days at posttest and follow-up. The Just Move intervention
significantly increased days of total physical activity from 2 days at pretest to 4 days at
posttest, but then fell to 3 days at follow-up. In conclusion, both interventions prevented loss
of activity and promoted an increase days of total physical activity from pretest to follow-up.

*Research Question: Did the Take Control intervention increase days of total physical
activity, above and beyond that of the Just Move intervention?*

The 2X3 mixed model ANOVA revealed a significant group effect for days of total
physical activity. At follow-up, the Take Control group reported 4 days of total activity as
compared to the Just Move group, who reported 3 days of total physical activity. To
conclude, the Take Control group increased days of total physical activity above and beyond
that of the Just Move group.
Discussion:

The analysis revealed a significant time effect. A past study (Hallam & Petosa, 2004) reported a small effect size (1/3 standard deviation increase) for total bouts of physical activity for the SCT-based group from pretest to posttest. The current study revealed a large effect size (1.5 standard deviation increase from pretest to posttest) for the Take Control (SCT-based) group. Since the sample size is small, the results most likely did not occur by chance. It is encouraging that the present study was more successful at increasing total bouts physical activity as compared to a past study (Hallam & Petosa, 2004).

The analysis revealed a significant group effect. The means for days of total physical activity are consistently higher in the Take Control group as compared to the Just Move group. At follow-up, the Take Control reported engaging in 4 days of total physical activity. At follow-up, the Just Move group reported engaging in 3 days of total physical activity. The one day increase seen in the Take Control group is statistically and practically significant. Increasing activity by one day has the potential to have an impact on an individual’s health by decreasing chronic diseases, such as heart disease and stroke.

An interesting finding occurred with days of total physical activity. To recall, days of total physical activity was the combination of moderate days and vigorous days. Days of moderate physical activity and days of vigorous activity revealed a non-significant group effect. All participants reported about 1 day of vigorous activity at pretest, posttest, and follow-up, thus no group effect would be expected. For days of moderate physical activity, participants in the Take Control group and the Just Move group reported about: 2 days at pretest, 4 days at posttest, and 3 days of follow-up. Both groups are increasing and decreasing at the same rate for days of moderate physical activity, thus no group effect. Even though there was no statistical difference between the groups; the mean for the Take Control group is consistently higher than that of the Just Move group. When the days of moderate physical activity and days of vigorous activity are combined, then the mean difference between the groups becomes significant, thus a group effect is seen for days of
total physical activity. The difference can be seen at follow-up. The Take Control group maintained 4 days of total physical activity at follow-up whereas the Just Move group fell to 3 days of total physical activity at follow-up. This reveals that even after the intervention was removed, the participants in the Take Control group were able to maintain the increased level of physical activity. The Take Control intervention had a sustaining impact on days of total physical activity.
Construct Validity of the Treatment

Summary & Conclusions

Introduction:

Construct validation is a method of determining the impact the intervention had on the constructs from the Social Cognitive Theory. This approach allows researchers the ability to assess the effectiveness of the intervention to change the targeted theoretical constructs (Hallam & Petosa, 2004). In construct validation one is measuring the “change” in the independent variables. In this study self-regulation, self-efficacy, and social support are the constructs that were measured. The intervention was designed to increase the use of self-regulation skills, to address physical activity barriers (self-efficacy), and to increase to use and skills of social support. The assumption is that if the intervention was successful at address the constructs, then an increase in the mean from pretest to posttest would be illustrated. These changes in targeted constructs could be a partial explanation for observed changes in physical activity.

Self-Efficacy:

Research Question: Did Self-Efficacy increase over the study?

A 2X3 mixed model ANOVA revealed a non-significant time effect for self-efficacy (p>.05). The analysis revealed that there in no significant difference between pretest, posttest, and follow-up for self-efficacy. To conclude, self-efficacy did not increase over the study.

Research Question: Did the Take Control group increase self-efficacy above and beyond that of the Just Move group?

The 2X3 mixed model ANOVA revealed a non-significant group effect for self-efficacy. The analysis reveal that there is no significant difference between the Take Control group and the Just Move group. To conclude, the Take Control group did not increase self-efficacy significantly above and beyond that of the Just Move group.
Discussion:

For the Take Control group, though not significant, there is an increase in mean scores from pretest to posttest. This indicates that the Take Control participants increased their confidence to overcome physical activity barriers from pretest to posttest and were able maintain their level of confidence at follow-up.

For the Just Move group, there was a constant decrease throughout the study. This indicates that as the study progressed, the Just Move participants lost confidence in their ability to overcome physical activity barriers. A similar pattern has been reported by Hallam & Petosa (2004). The Hallam & Petosa (2004) study reported that participants assigned to the Social Cognitive Theory-based group, not only increased there self-efficacy from the pretest to posttest (6 week intervention); but the rates of self-efficacy continued to rise at the 6 month and at the 12 month periods. Also similar to the present study was the decline of the comparison subjects. In the Hallam & Petosa (2004) study, the self-efficacy rates of the comparison group continue to decline throughout the 12 month study.

As with the present study, the Grim (2003) study found no group effect and no time effect for self-efficacy. Similar to the current study, Grim (2003) and Hallam & Petosa (2004) reported a small effect size (1/6 to ¼ standard deviation increase).


For the Take Control group, a possible reason for the increase and maintenance of self-efficacy was worksheet 3. Eighty percent of participants completed worksheet 3 as
intended. Worksheet 3 instructed participants to list the exercise barriers and then to develop a plan of action for each identified barrier. Since participants were to develop a plan of action for exercise barriers, perhaps this skill was able to increase the participant’s confidence in overcoming exercise barriers. It appears that worksheet 3 had a small impact on levels of self-efficacy. Perhaps the lesson got participants to start thinking about how to overcome barriers and participants began to put some plans in action, but the lesson lack rigor that was needed to see a bigger impact.

Just Move participants were not taught specific skills to overcome barriers. The AHA sections of: ‘Things to Consider’; ‘Myths About Exercise’; ‘Keys to Success’ briefly mentioned barriers, but a specific plan of action was not discussed. Perhaps this was the reason for the decrease in self-efficacy throughout the study. As the Just Move participants encountered barriers for engaging in physical activity, there was no plan of action in place to help participants overcome those barriers.

Five home-based studies measured self-efficacy (Garcia & King, 1991; Oman & King, 1998; Wilbur et al., 2003; Nies et al., 2003 and the studies by Bock et al., 2001 & Marcus, Bock et al., 1998). All the home-based studies, except for Nies et al. (2003), found self-efficacy to be a significant factor for physical activity. The Stanford Sunnyvale study by Garcia & King (1991) revealed that self-efficacy accounted the most variance (17%) in predicting exercise adherence. Wilber et al. (2003) reported self-efficacy to be associated with walking (p=.033). The study by Bock et al. (2001) reported that individual who met ACSM recommendation reported significantly higher levels of self-efficacy Marcus, Bock, Pinto et al. (1998) article is the home-based article that could be used for comparison. In that study participants were randomly assigned to a group that received four stage-based manuals (stage-based group) or to a group that received four brochures from the American Heart Association (AHA) over the course of six months. Participants in both the stage-based group and the standard care (AHA) group significantly increased self-efficacy from pretest to posttest (p<.01, small effect size). These results differ from the current study.
Even though the increase in self-efficacy seen in the Take Control group is not significant, it could hold practical implications. The current study (along with Hallam & Petsa, 1998 and Grim, 2003) illustrate that even a small dosage (one lesson) of self-efficacy can maintain levels of self-efficacy. The home-based studies by Marcus, Bock, Pinto et al. (1998), Garcia & King (1991) reveal that long-term (6 months or more) minimal contact interventions can have a significant impact on levels of self-efficacy. It appears from the literature that self-efficacy may take awhile to develop. Perhaps the studies by Hallam & Petosa (1998) and Grim (2003) as well as the present study were not long enough in duration to develop the skills of self-efficacy.

Social Support Family and Friend:

Research Question: Did Social Support-Friend, Social Support-Family increase over the study?

The 2X3 mixed model ANOVA revealed a non-significant time effect (p>.05) for Social Support-Family and Social Support-Friend. These analyses reveal that there was no significant difference for social support-family or social-support friend, at pretest, posttest, or follow-up. In conclusion, social support-family and social support-friend did not increase over the study.

Research Question: Did the Take Control group increase Social Support-Friend, Social Support-Family above and beyond the Just Move group?

The 2X3 mixed model ANOVA revealed a non-significant group effect for social support-family. Therefore, social support family is not significantly different between the Take Control group and the Just Move group.

The 2X3 ANOVA revealed a significant group effect for social support-friend. The statistical analysis would support that the Take Control group reported more social support-friend than the Just Move group.
In conclusion, the Take Control group reported significantly more social support-friend than the Just Move group. The Take Control group did not report significantly more social support-family as compared to the Just Move group.

Discussion:

The analysis revealed a significant group effect for social support-friend. The difference between a posttest mean of 27 (Take Control group) and a posttest mean of 23 (Just Move) is statistical significant. But there is no practical significance. A mean of 27 and a mean of 23 were equivalent to participants answering a “2 rarely” for each item on the social support scale. There is not a practical difference between the Take Control group and the Just Move group. At all time frames, for the Take Control group and the Just Move group, the average response per item was about a “2- rarely” (on a 5 point scale).

The intervention was not successful at significantly improving social support-friend or social support-family. The Grim (2003) study revealed a “small” effect size for both social support-family and social support-friend. According to the Grim (2003) study, one can expect about a ¼ of standard deviation difference from pretest to posttest for social support. The present study resulted in about a 1/10 of a standard deviation increase from pretest to posttest.

Two home-based studies measure social support (Nies, et al., 2003 and Dunn, Marcus, Kampert, et al., 1997 (Project Active). The study by Nies et al. (2003) did not find social support to be significant. Participants in the Nies et al. (2003) study received 16 phone calls over a 24 week period. Home-based participants in Project Active met in groups for an hour on a weekly basis from week one to week sixteen and then biweekly from week seventeen to week twenty-four. According to the intervention described in Kohl, Dunn, et al. (1998) it appears that during week four, the topic was “Enlisting Aid: Identification of social support sources and types of social support”. No detailed description of the class lesson was given. Project Active revealed that social support was a significant factor for exercise for the...
home-based group. It should be noted, that home-based exercise regimen participants met in
groups on a weekly basis. Perhaps by meeting in a group setting more material was covered
and more in depth information was given to the participants. Perhaps the weekly classroom-
group setting alone is enough to improve social support.

The Grim study (2003) utilized the same social support instrument and had similar
results. The Grim study reports no time effect and no group effect for social support-family.
Although the Grim (2003) study reported a significant time effect for social support-friend, all
the three group means are equivalent subjects answering “2-rarely” on all social support
questions. It would appear that there is a significant difference, but not a practical difference
for that particular study.

The Take Control group received one worksheet that was designed to address social
support (Worksheet 5). Worksheet 5 directed subjects the find three types of social support:
encouragement, exercise buddy, & help with responsibilities. For each type of social support,
subjects were to recruit a person. There could be a few explanations for the results for the
Take Control group. The first explanation could be that one worksheet was not enough to
address social support. The second explanation could be that the worksheet required
subjects to recruit their own person for social support. Recruitment skills were not taught as
part of worksheet 5. Thus, perhaps subjects did not have the skills necessary to recruit their
own person for social support. Since subjects lacked the necessary skills, the worksheet
could not be completed as intended. The concept that subjects could not complete the social
support worksheet as intended was seen in the process evaluation. Only 32% completed the
social support worksheet as intended. According to the Process Evaluation, the social
support worksheet (Worksheet 5) for the Take Control group received the lowest percentage
for useful/very useful (45%). Since subjects did not find the worksheet on social support
useful, perhaps they did not actively engage in the self-guided worksheets adequately and
thus social support would not be a significant factor in the analysis.
Considering the different approaches to social support in Project Active, Nies et al. (2003), in Grim (2003) and in the present study – perhaps the method in which social support is “taught” is important. Participants in the Nies et al. (2003) study received brief phone calls. The Grim (2003) study was a web-based study in which participants were to complete self-directed worksheet via the internet. In the current study, participants received weekly self-guided worksheets that were delivered to their home. In Project Active, home-based participants met in weekly groups to received intervention materials. Perhaps individual interventions, with self-guided techniques, are not an effective method for “teaching” participants how to elicit social support. Perhaps the classroom-based technique is more effective. Or perhaps that just by being in a classroom setting social support is given or received without having it having to be directly taught. It could be hypothesized to increase social support, face-to-face social interaction is needed.

Self-Regulation:

Research Question: Did self-regulation increase over the study?

The 2X3 mixed model ANOVA revealed a significant time effect (p<.05) for self-regulation. The analyses would support that self-regulation significantly increased from pretest to posttest. To conclude, self-regulation increased over the study.

Research Question: Did the Take Control group increase self-regulation above and beyond the Just Move group?

The 2X3 mixed model ANOVA revealed a significant group effect (p<.05). The analysis would support that self-regulation was significantly higher in the Take Control group as compared to the Just Move group at posttest and at follow-up. To conclude, the Take Control group increase self-regulation above and beyond the Just Move group.
Discussion:

The analysis revealed a significant time effect with a large effect size for the Take Control group. The Grim (2003) study resulted in a “large” effect size and the Hallam & Petosa (1998, 2004) study resulted in a “medium” effect size for self-regulation. Grim (2003) “large” effect was about 1.5 standard deviation increase from pretest to posttest, while the Hallam & Petosa (1998, 2004) “medium” effect was about a 1.0 standard deviation increase from pretest to posttest.

The Take Control displayed a greater increase in self-regulation. However, it should be noted that both groups steadily increased their use of self-regulation over the course of the intervention. Perhaps the weekly goal setting and physical activity self-monitoring via activity logs produced the steady increase in self-regulation.

The analysis revealed a significant group effect. The Take Control means for self-regulation are consistently higher than those for the Just Move group. For the Take Control group, the mean at posttest (mean=142) and the mean at follow-up (mean=146) were equivalent to participants responding a “3 -sometimes” use of self-regulation skills, for each item on the scale. The Just Move group, the posttest mean (mean =116) and the follow-up mean (mean=122) was equivalent to participants responding to a “2 “rarely” use of self-regulation, for each item on the scale.

Many of Take Control worksheets were designed to address the skills related to self-regulation. Worksheets that addressed self-regulation include worksheet 4 (time management) and worksheet 6 (Planning for Long Term Adherence). In addition, each subject was also to monitor their physical activity and to set weekly goals. However, the Just Move group was only taught the self-regulation skills of goal setting and self-monitoring. Perhaps since the Take Control participants were more engaged in self-regulation skills, it produced a greater increase in self-regulation.

According to the Process Evaluation, the time management worksheet (worksheet 4) received the highest percentage for being useful/very useful (63%) for subjects in the Take Control group.
Control group. Both Take Control and Just Move subjects found “weekly goal setting” (69% Take Control, 80% Just Move) and “keeping track of physical activity” (72% Take Control, 76% Just Move) to be useful/very useful. Perhaps since the participants found the self-regulation worksheets and techniques to be useful, they actively engaged in the worksheets and put the skills to use.

Among interventions that have utilized self-regulation (Hallam & Petosa, 2004; Grim, 2003); self-regulation appears to be a strong factor. In the Grim (2003) study and in Hallam & Petosa (2004) study, self-regulation significantly increases from pretest to posttest for the SCT-based group. In the Grim (2003) study, the SCT-based group self-regulation scores fell from posttest to follow-up. In the Hallam & Petosa studies (1998, 2004), self-regulation not only increases from pretest to posttest for the SCT-based group, but continues to climb even after the intervention has ended.

Conclusions:

The concept of construct validation of the treatment is that lessons are developed for an intervention that is designed to target specific theoretical constructs. If the intervention is successful then an increase in those targeted constructs should be seen post intervention. The increase in those targeted theoretical constructs should impact the behavior, physical activity.

In the present study only self-regulation significantly increased from pretest to posttest. The intervention did not appear to have a practical impact on social support or self-efficacy. As discussed earlier, self-regulation was more embodied in the intervention (multiple worksheets, goal setting, self-monitoring). The constructs of self-efficacy and social support were not equally covered, usually in one worksheet. The intervention did not adequately cover social support and self-efficacy, thus those constructs did not significantly increase post intervention. For the Take Control group, 86% percent of the participants completed the 3 out of 5 of the worksheets as intended. A possible reason for the lack of impact could be
that the Take Control participants did not complete all six worksheets as intended. Since the participants did not complete all worksheets as intended, the full benefit of the worksheets was not received. Thus the impact of the Take Control intervention was lessened.

The Take Control group received Social Cognitive Theory tailored worksheets. The Just Move intervention was a standard educational intervention. Both intervention (Take Control and Just Move) increased days of moderate physical activity and days of total physical activity. It appears that overall the SCT-based intervention did not improve physical activity above and beyond a standard education intervention. The Just Move group did not significantly increase self-regulation, self-efficacy, or social support, yet days of moderate activity and days of total physical activity significantly increased. As seen in the Just Move group, other factors, other the SCT-constructs, which were not measured in the study, are causing the increase in physical activity. It is possible that self-regulation was responsible for some of the increase in physical activity. Both groups monitored their activity and set weekly goals. Those behaviors could have caused an increase in physical activity. Another possibility is that participants increased activity due to Hawthorne Effect. Participants knew they were a part of a study, thus they would have increased activity regardless of the intervention. It is also possible that since participants were already engaging in exercise prior to entry into the intervention, the intervention was a source of validation for what the participants were already engaged in. This study does not clearly link the Social Cognitive Theory constructs to increases in physical activity.

**Implications to Theory**

In the home-based literature, only five (of sixteen) studies implement theoretical constructs. The current study targeted three constructs from the Social Cognitive Theory; self-regulation, self-efficacy, and social support. Results from the study would support that
the intervention was not successful at significantly improving perceptions of self-efficacy or social support. The intervention was successful at significantly improving use of self-regulation skills. These findings are similar to past studies that have targeted SCT constructs (Grim, 2003 and Hallam & Petosa, 1998, 2004).

The first construct targeted was self-regulation. Bandura (1997) states that for most people “adoption and maintenance of lifestyle activity patterns requires development of self-regulatory capabilities (pg. 415).” Self-regulation operates through three main sub-functions: self-monitoring, goal setting, and enlistment of self-incentives for personal change (Bandura, 1997).

Development of self-regulation skills was one of the goals of the intervention. The intervention focused on skills such as goal setting and self-monitoring of physical activity. These skills were practiced and applied on a weekly basis. Self-observation is the observing or monitoring of one’s own behavior (Bandura, 1986). Self-observation provides two important functions: information needed to set realistic goals; and evaluation of progress towards these goals. According to Bandura (1997), temporal proximity impact self-observed behavior. Self-directed behavior is more readily achieved when consequences are to bear on present bear, rather than distal behavior (Bandura, 1986). According to the theory, daily monitoring of activity would be more helpful rather than tallying weekly activity. All participants in the Take Control and Just Move groups were required to monitor their physical activity on a daily basis for a period of six weeks (self-observation). Self-monitoring of behavior also increases awareness of patterns of behavior. Subjects in the Take Control and Just Move groups reported that self-monitoring their exercise behavior, made them more aware of their activity (or lack there of).

The second component of self-regulation involves tangible and evaluative self-incentives people create for their own behavior. People who reward themselves achieve greater success than those who do not. This component of self-regulation is lacking in the intervention. Participants were not required to reward themselves for meeting goals.
The third component of self-regulation is goal setting. Self-directed change requires goals for motivating and guiding efforts. Goal attainment boosts self-efficacy. Self-efficacy in return, determines commitment to exercise and perseverance in the mist of barriers. Progressive mastery strengthens belief in physical capabilities (Bandura, 1986). All participants in the Take Control intervention and in the Just Move intervention were to set weekly exercise goals.

In addition, the self-regulatory skills of time management and relapse prevention were targeted. Bandura (1997) stresses the importance of time management skills in the adoption and maintenance of physical activity. “without some explicit time management, exercise readily falls to competing activities (Bandura, 1997, p.445).” Participants in the Take Control group received a series of self-guided worksheets that designed to target specific self-regulatory skills. Worksheet 4 (time management) instructed participants to monitor all activities for a period of one week. This assignment was designed to increase awareness of where their time was spent. Participants were to record daily activities and were to identify times and days were more convenient for fitting physical activity into your schedule.

Worksheet 6 was designed to address relapse prevention. Participants were to rate the likelihood of use of each lesson in the future. Participants were also to identify activities that could be conducted during each season (winter, fall, summer, and spring). Participants were to set exercise goals that were specific to the four seasons.

The analyses revealed a significant time effect (with a large effect size) and group effect (with a medium effect size). These results are comparable to the Grim (2003) and Hallam & Petosa (1998, 2004) studies. Given the small sample size, the results most likely did not occur by chance. The self-regulation targeted worksheets in the Take Control intervention can be attributed to the improvements in self-regulation. The Take Control and the Just Move interventions targeted two of the three components of self-regulation. The self-regulation component of evaluative self-incentives is lacking in the interventions. Participants
were not given specific instructions on rewarding oneself. The other self-regulation components of self-observation (self-monitoring) and goal setting were targeted in the interventions. All participants were to set weekly goals and to monitor their daily physical activity. In addition, participants in the Take Control intervention received weekly worksheets that were designed to address a specific SCT construct. The Take Control intervention had an impact on self-regulation and thus it appears that the intervention had construct validation for self-regulation.

The second construct from the SCT that was targeted in the study was self-efficacy. Self-efficacy is thought to be important in the early stages of exercise adoption (Sherwood & Jeffery, 2000). In the early stages of exercise adoption, exercise frequency is related to perception of physical abilities and the confidence to overcome barriers. Individuals with greater self-efficacy are more likely to adhere to an exercise program and thus more likely to make exercise a habitual behavior (Sherwood & Jeffery, 2000). Minimizing perceptions of barriers and developing strategies to overcome barriers are skills to target in an intervention to alter perceptions of self-efficacy (Sherwood & Jeffery, 2000). Once an individual begins to exercise, feedback on their progress can help maintain and promote exercise self-efficacy (Sherwood & Jeffery, 2000).

According to Bandura, efficacy is based on four principal sources of information: mastery of skill, vicarious experiences, verbal persuasion, and physiological state (Bandura, 1986). The first principal is vicarious experience. Seeing other people successful engaged in a behavior, can raise self perception in the individual in that they too have the capabilities to succeed. Verbal persuasion is talking people into believing that they have the capability to achieve the behavior. Positive feedback that encourages their capabilities can increase self-efficacy. Negative feedback or no feedback at all, can lessen perceptions of self-efficacy. Physiological state refers to aspects of the physical body. In exercise behavior, being out of breath, aches, fatigue, etc may influence perceptions of their physical capabilities to engage in exercise. Thus once an individual experiences these symptoms, their belief in their ability
to be successful is challenged. Mastery of skill is the most important factor in altering perceptions of self-efficacy (Bandura, 1986). Successes raise efficacy, while repeat failures lower efficacy. Bandura states that mastery of skills can be achieve by meeting performance expectations and goals.

The intervention targeted exercise self-efficacy according to suggestions by Sherwood & Jeffery (2000). Take Control participants received one self-guided worksheet that targeted self-efficacy. In the worksheet, participants were to identify barriers and to develop a plan of action for overcoming the identified barriers. According to Bandura (1986) mastery of skill is the most important factor to alter self-efficacy. All participants were required to set six weekly, obtainable goals. Obtaining weekly exercise goals was designed to increase self-efficacy through the principle of mastery of skill. Worksheet 1 (Exercise Preferences) was also designed to improve self-efficacy through mastery of skill. In this lesson participants were to respond to a series of questions. These questions were designed to guide participants to activities that they perceived as enjoyable. Mastery of skill can be accomplished by having participant engage in activities that are enjoyable and obtainable for them. This is accomplished by obtaining exercise performance goals.

However, the intervention was not successful at achieving a significant change in self-efficacy. For the Take Control group there was a slight increase in self-efficacy from pretest to posttest (though not significant) and the level was maintained at follow-up. There are several possibilities as to why the intervention was not successful at producing a significant change in self-efficacy. The first explanation could be dose response. Participants in the Take Control group received only one lesson that was specifically designed to increase one confidence to overcome barriers. Perhaps one lesson is not enough exposure to improve self-efficacy. This hypothesis was supported in the literature. The Hallam & Petosa (1998, 2004) subjects attended four one-hour class sessions. In the Grim (2003) study, subjects completed self-guided worksheets via the internet. The In both studies, self-efficacy was only covered in one lesson. Both studies (Hallam & Petosa, 1998, 2004 and Grim, 2003) were not
successful at producing significant improvements in self-efficacy. It appears from the literature that one dose is enough to prevent loss of self-efficacy, but not enough to produce significant improvements.

The second explanation could be duration of the intervention. The aspects of the intervention that were to improve mastery of skill were not long enough in duration. Perhaps six weeks in not a long enough period for adults to master the skill of goal setting. In addition, six weeks may not be long enough for adults to adopt and to master an exercise behavior. This hypothesis was supported by the literature. In the studies by Hallam & Petosa (1998, 2004) and Grim (2003) self-efficacy increased slightly from pretest to posttest, though not significantly. These studies were both short in duration (lasting 4 weeks to 10 weeks, respectively). The home-based studies by Marcus, Bock, Pinto et al. (1998) and Garcia & King (1991) reveal that long-term (6 months or more) minimal contact interventions can have a significant impact on levels of self-efficacy. It appears from the literature that self-efficacy develops over time and that longer exposure to self-efficacy is needed to have a positive, significant impact on self-efficacy.

Another suggestion could be that according to Bandura (1986, 1997) self-observation of behavior can hinder self-efficacy. At the beginning of exercise adoption, individuals set exercise goals and performance goals that may be too demanding or too intense. Bandura (1986) states that the physiological state influences self-efficacy. So when individuals engage in a behavior that they perceived they are capable of achieving, the physiological response (heavy breathing, fatigue, soreness) is too much. They may perceive that they are not physiologically capable of achieving their exercise goals and performance goals. Bandura (1986) states that vicarious experience and verbal persuasion influence self-efficacy. Although participants received written encouragement to achieve ACSM moderate or vigorous activity via feedback on logs, they did not receive verbal praise (verbal persuasion). Although all participants received weekly phone calls, the purpose of the phone call was to remind them to: set goal, monitor behavior, and to remind them of the pick up day.
The purpose of the phone call was not to provide social support or to provide verbal persuasion to improve physical activity. Bandura (1986) states that vicarious experience influences self-efficacy. Participants were encouraged to engage in neighborhood walks and other Neighborhood on the Move activities. However, no specific “group” activities were planned. Participants did not receive any direct vicarious learning from other participants.

The third construct from the SCT that was targeted for this study was social support. Social support received by friends and family contribute to perceived self-regulatory efficacy to continue in engaging in exercise (Hofstetter, Hovell, & Sallis, 1990). Bandura (1997) states that “a strong sense of social efficacy facilitates development of socially supportive relationships, and social support, in turn enhances self-efficacy (Bandura, 1997, p. 206).”

Worksheet 5 of the Take Control intervention addressed social support. Participants received one self-guided worksheets in which they were asked to find three people to help them address the three areas of social support. The first social support step was to find an ‘exercise buddy’. Participants were to recruit someone to exercise with them. The second type of social support was ‘time relief’. In this step, participants were asked to recruit someone to take over responsibilities such as, taking over domestic responsibilities or taking over childcare. The third type of social support was ‘encouragement’. In this step participants were asked to recruit a person that would give encourage for the participant to continue exercising. The intervention failed to show any significant improvements in social support family or social support friend. Possible explanations could be related to dose-response. One self-guided lesson does not provide enough exposure. A second explanation is that individuals were to recruit their own support and perhaps individuals did not have the skill to recruit. Grim (2003) revealed a similar result, in that no practical significant difference was found for social support family or social support friend. Participants in the Grim (2003) study completed self-guided worksheets via the internet. Social support was covered in one worksheet. Given the results from the two studies, one lesson does not appear to be adequate to have an impact on social support.
Bandura (1998, 2004) states that self-efficacy impacts self-regulation. Bandura (2004) suggests that persons with high self-efficacy use self-management skills to overcome the barrier. Just Move participants did not receive any specific worksheets or information to address barriers to exercise and therefore self-efficacy drops continuously in the Just Move group. The Take Control group received one worksheet that specifically addressed barriers to exercise. Although this one worksheet was not enough dose response to provide significant improvements in self-efficacy; it may have been enough to prevent self-efficacy from falling. It could be hypothesized that the maintenance of self-efficacy (as seen in the Take Control group) provided the tools needed to increase self-regulation. Self-regulation increase for both groups, but only significantly in the Take Control group. Perhaps the taught skills of goal setting and self-monitoring are enough to have a slight impact on self-regulation (as in the Just Move group), but the levels of self-efficacy are not present to give the “boost” that is needed for have substantial improvements in self-regulation. The significant increase of self-regulation in the Take Control group could be partially explained by the maintenance of self-efficacy. Along that same thought pattern, perhaps self-efficacy in the Take Control group is maintained because they received adequate amounts of self-regulation skills. Even though the Take Control intervention did not adequately cover self-efficacy, the participants received self-regulation skills from a variety of sources (logs, goal, worksheets) and the taught self-regulation skills were enough to prevent self-efficacy from falling.

Self-regulatory skills and self-efficacy can improve relapse prevention (Bandura, 1997). Persons who develop self-regulatory skills are able to overcome obstacles. By overcoming obstacles, self-efficacy increases. Bandura (1997) also states the importance of time management. Without time management skills, it is difficult to adhere to an exercise regimen in the mist of competing activities and distractions. Perhaps the Just Move group did not significantly increase self-regulation because they lacked relapse prevention skills and time management skills. One could also hypothesize that perhaps self-efficacy continues to
fall in the Just Move group, because they did not receive adequate amounts of self-regulation skills to overcome obstacles, thus reducing self-efficacy.

Bandura (1997) suggests that social support enhances self-efficacy. Data from the study revealed that both groups did not have any improvement for social support-family or social support-friend. Lack of improvements of self-efficacy could be partially explained by the lack of social support.

Process Evaluation

Level of Completeness:

A limitation of a home-based program is that the researcher cannot directly observe participation. To help compensate for lack of direct observation, the researcher subjectively evaluated each worksheet and exercise log for level of completeness. Each worksheet and log was scored on a scale of 0 (not completed at all) to 5 (completed as intended).

Take Control:

Eighty-six percent of Take Control subjects completed worksheets 2, 3, and 6 as intended. Participants struggled with worksheet 1, with only 43% of participants completing the lesson as intended. However, the researcher felt that the problem with worksheet 1 was that the participants were unfamiliar with the process. Once feedback was given, 75% complete worksheet 1 as intended. Participants appeared to struggle with worksheet 4 (time management) and worksheet 5 (social support). Fifty percent of participants completed worksheet 4 as intended. It appeared that subjects were reporting only certain activities on the time management calendar and that some participants were copying from one day to another. Only 32% completed worksheet 5 as intended. Forty percent had listed the same person for all three of the social support areas. For the logs, 82% completed logs for weeks 1-6 as intended.
Overall, about 50% of the worksheets were completed as intended. The level of worksheet completion could have impacted the results of the study. Three of the six worksheets revealed problems with implementation. The Take Control intervention was not fully implemented as intended. Had participants completed all six worksheets as intended, perhaps the impact the Take Control intervention had on the Social Cognitive Theory variables would have been greater. If the Take Control intervention would have had a greater impact on the SCT variables, perhaps a greater impact of physical activity would have also been seen. More emphasis on development and implementation of the SCT-based worksheets needs to be conducted.

**Just Move:**

Eighty-six percent of the Just Move participants reported reading both the Just Move and the Exercise and Your Heart brochures. During the intervention, all Just Move participants turned in exercise logs. Eighty-five percent of Just Move participants completed the exercise logs as intended.

**Cost-Benefit Analysis:**

**Take Control Group:**

The Take Control group received weekly worksheets that were delivered to the participant’s home. Each week, the researcher would printout each worksheet. On a weekly basis, the researcher would phone call the participants as a reminder that the worksheet was due. If the participant was not at home, a phone message was left for the participant. Each week, the participant drove to the participant’s home. A round trip took approximately 20 minutes. On occasions, the participant had not left the “old” worksheet for the researcher to pick-up. The research would make an additional trip to home.

Face-to-face contact was tracked by the researcher. Dates on which the worksheet were dropped off and picked up were tracked as well. The researcher tracked the weekly
exercise logs that were provided by each worksheet. The researcher also provided feedback on each worksheet. The process of: printing the worksheet; delivering the worksheet; phoning each participant, tracking the logs, dates, and face-to-face contact, took approximately 1.5 to 2 hours per participant per week.

It was assumed that researcher was paid $40/hour. If it was assumed it took 1.5 – 2 hours per week, per participant. That would equal $60-80 per week, per participant. It was assumed it took 2 hours per participant. There are 32 participants in the Take Control group:

$80 * 32 = $2560 per week for Take Control intervention.

The intervention is 6 weeks in length.

$2560 * 6 = $15,360.00

In addition, the posttest was distributed at week 8 and the follow-up was distributed at week 12. The posttest and follow-up surveys had to be printed out and then distributed to the participant. The posttest and follow-up surveys took approximately 45-60 minutes per participant; per survey. For one hour of activity, for 32 participants; that would be: $1280.

Time Expense:

$15,360 intervention
$ 1,280 posttest
$ 1,280 follow-up

$17,920  = intervention, posttest, follow-up time expense

Just Move Group:

For the Just Move group, participants were phone every week to remind them to set their weekly goals and to track their physical activity. Just Move participant received new material at Week 1, Week 3, and Week 6. New material was delivered to the participant’s home. The “old” lessons were picked-up from the participant at that time. On occasion, the participants would forget to put out material to be picked-up. Therefore the researcher would make an additional trip to the participant’s home. The researcher tracked face-to-face
contact, as well as dates on which material was dropped off and picked up. The researcher
also tracked physical activity via the weekly exercise logs.

The whole process took approximately 45-60 minutes per participant. It is assumed that it
took 1 hour at $40/hour.

\[40 \times 28 \text{ participants} = 1120\]

The intervention was 6 weeks in length.

\[1120 \times 6 = 6720\]

Posttest and follow-up were assumed to take 1 hour per survey.

\[
\begin{align*}
&6720 \text{ Intervention} \\
&1120 \text{ posttest} \\
&1120 \text{ follow-up}
\end{align*}
\]

\[8960 \text{ for the Just Move intervention}\]

The Take Control intervention is twice as expensive as the Just Move intervention. However,
the Take Control intervention group illustrated higher means for all the SCT variables at all
time frames. However, only the variable of self-regulation was significantly different from
pretest and follow-up. From a behaviorally perspective, there was only a significant difference
between the groups for total days of physical activity. Although, the results from the Take
Control intervention are modest, it is too early in research development of SCT and physical
activity adherence to abandon further research in this area.

**Limitations of the Study**

There are several limitations to this study. One limitation was the issue of self-report.
All questionnaires distributed to the participants at pretest, posttest, and follow-up were self-
report instruments. In addition, the logs and worksheet were through self-report. Subjects
also were aware that they were involved in a study. Subjects could have lied to the researcher or could have given answers that were perceived as favorable answers.

The participants in the study were volunteers who responded to recruitment techniques. It is probable, that subjects who self-selected to be in the study were motivated and ready to be physically active. This can be seen by the lack of subject mortality. No subject in the Just Move group dropped from the study. Only two participants in the Take Control intervention dropped from the study.

Although subject retention was not difficult, recruitment was extremely difficult. Recruitment began in July and ended the following April. The recruitment period lasted for 10 months. As discussed in Chapter 3, recruitment procedures included: phone calls, door-to-door flyers, monthly newsletters, and current members recruiting new members. Out of the 167 phone numbers called, 8 agreed to participate (4%). Of the 289 households that received a door-to-door flyer, 5 household responded. By far, the monthly newsletters (n=20) and having current members recruit new members (n=24) were the most efficient recruitment methods.

Another limitation of the study was the basic structure of the study. Participants were to conduct the lessons or to read the brochures on their own time. Therefore it not possible to determine to what level the participants engage in lesson or brochure activity. It is possible that participants could have rushed to complete the lessons or could have made up material. Another possible limitation is the order of lessons. It is possible that if the order of lessons were re-arranged, then there might be difference in the amount of differences found between the group and between the time frames.

Another limitation was that some of the participants in the study were already active. Approximately 12% of Take Control participants were meeting ACSM moderate activity recommendations and 19% were meeting ACSM vigorous activity recommendations at pretest. Approximately 11% of Just Move participants were meeting ACSM moderate activity recommendations and 4% were meeting ACSM vigorous recommendations at pretest. The
participants who are already active have little room for improvement. Their lack of improvement may screw the results by making the intervention seem less effective.

Participants in the Take Control and in the Just Move group were instructed on the ACSM moderate and vigorous activity recommendations. Participants also received feedback on weekly logs that encouraged participants to achieve either moderate or vigorous recommendations. However, a specific exercise regimen was not prescribed. Participants were free to choose moderate or vigorous activities (free living). An advantage of “free living” physical activity is that it allows participants to choose activities that are enjoyable to them. A disadvantage of the “free living” physical activity is that participants may be confused as to the intensity, mode, or duration of activity that is needed to achieve ACSM recommendations.

Lastly, the short duration of the intervention was a limitation. In the home-based literature, interventions that lasted 6 months or longer showed more significant increases in physical activity measures and in behavioral/cognitive measures.

Recommendations for Change for the Intervention

Process Evaluation:

From the process evaluation, it became apparent that for the Take Control group, time allotted to complete the worksheets needed to be longer. Perhaps worksheets should be given bi-weekly instead of weekly. Worksheet 4 was time management. It became apparent that participants did not fully comprehend what activities were to be monitored on the time management sheet. More detail and examples need to be distributed with the time management worksheet.

For the Just Move intervention, the two brochure distributed to the participants were not reported as being useful. Perhaps more brochures or different brochures could be
distributed to the participants. Brochures such as ‘walking for a healthy heart’ or ‘cycling for a healthy heart’ would be useful for the subjects.

Both the Take Control group and the Just Move group found tracking of physical activity to be useful, but goal setting section was confusing. Perhaps instead of asking goal setting questions every week for 12 weeks, there should be one lesson on goal setting and then from that point, just a line for goal setting should be allocated.

**Intervention:**

The process evaluation revealed a problem with implementation for three out of the six worksheets. Worksheet 5 addressed social support. The process evaluation revealed that this worksheet was not complete as intended. In addition, participants did not find worksheet 5 to be useful. The social support worksheet assumed that subjects had the skills to recruit social support. Perhaps either worksheets need to be created to address the skill of recruitment or a social support system within the intervention needs to be created.

Self-efficacy revealed a non-significant time effect and group effect. Only one worksheet addressed barriers to exercise and this worksheet was received at week 3. At week 4 – 5 is when most subjects in the Take Control group began to communicate time barriers. Perhaps Lesson 3 - barriers to exercise- was too early to impact subjects. Perhaps if the lesson would have been later in the intervention, subjects would have encountered more barriers and therefore would have been able to identify and develop a plan of action for the barriers. Another possibility could be that more worksheets need to address barriers – perhaps one worksheet at the beginning of the intervention where participants list barriers they might encounter; and then one lesson towards the end of the intervention in which participants list the barriers they actually encountered throughout the program. Another suggestion for future studies is to have subjects keep a running list of barriers and as they encounter the barriers, have the participants develop a plan of action.
Lastly, the sedentary behavior was not a requirement for participation in the current study. Thus many participants in the Take Control intervention and in the Just Move intervention were already engaging in some form of physical activity prior to the study. The following study was based on the premises of exercise adoption. But subjects were already active, thus adoption of an exercise regimen was already present. Perhaps if a truly sedentary group was recruited, more impact on days of physical activity and SCT constructs would be seen.

**Implications for Practice**

Home-based interventions are a promising approach to improve days of moderate and total days of physical activity. Home-based, minimal contact, interventions can impact days of moderate physical activity and days of total physical activity. A home-based intervention, based on the SCT (TC), can increase use of self-regulation skills.

Professions should take the extra effort to implement a theory-based intervention. Lack of theory is a problem in exercise behavior research and this adds to the health education poverty cycle. Lack of theory and lack of valid and reliable measurements produce results that have no backing. An intervention that does not incorporate theoretical construct cannot determine the reason behind the results of the study. Researchers are left with “educated guesses” to answer the question “Why?” Theory provides a framework for understanding how to implement an intervention, as well as why the results occurred. If, as a profession, we are to break free of the health education poverty cycle, we must (as a profession) insist on more rigorous standards for research.
LIST OF REFERENCES


Winters, E. (2001). Test of social cognitive theory-based educational treatment to increase the frequency of voluntary moderate and vigorous physical activity among adolescent school students. Unpublished dissertation. The Ohio State University, Columbus, Ohio.
APPENDIX A

RECRUITMENT TELEPHONE SCRIPT
Recruitment Telephone Script
(to recruit participants for the study)

**Researcher:** May we speak to an adult (someone who is 18 or older) in the household?

**Responding Adult:** Hello?

**Researcher:** Hi. My name is ________. I am calling on behalf of Neighborhoods on the Move. If you haven’t heard of us, Neighborhoods on the Move is a community outreach program designed to increase physical activity in your neighborhood. As part of that outreach program, we are contacting people in the neighborhood to tell them about a new program that we are conducting.

   The program is designed to promote activity that you can do in your own home or neighborhood. There are no gyms or classes to attend. There are no fees to pay. We will come to your home and bring the materials to you.

   As part of the program, you will receive educational packets and incentives such as jump ropes, hand weights, pedometers, as well as cash. The program is 6 weeks in length. The program is designed for you to do at your own convenience in your own home and neighborhood.

   Would you be interested in joining the program?

**Responding Adult:**
   No – then **Researcher:** Thanks for your time.
   Yes  - then go to *Screening Telephone Script*
APPENDIX B

SCREENING TELEPHONE SCRIPT
Screening Telephone Script

(to be done if someone calls or if someone in the recruitment phone calls agrees to participation)

Researcher: Neighborhoods on the Move. This is ______ how can I help you?
Subject: I am calling about the self-directed physical activity program?
Researcher: Let me tell you some things about the program.
* The program is a self-directed or self-paced exercise program that is designed to be conducted in your own home.
* There is no required gym membership or equipment needed. The program is absolutely free for members in your neighborhood.
* The program last approximately 6 weeks.
* The program consists of educational material and logs that are designed to help individuals adopt and maintain exercise behavior.
* As a participant you will receive incentives such as: a key chain, a free pedometer, hand weights or a jump rope, and cash prizes.

Researcher: Where did you see this advertised?
Researcher: I just need to ask you a few questions.

1. Are you 18 or older? If YES, continue.
   If no,       “I am sorry to participate you must be 18 or older”

2. Are you male or female? Male     Female

PAR-Q
3. Yes   No Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
4. Yes   No Do you feel pain in your chest when you do physical activity?
5. Yes   No In the past month, have you had chest pain when you were not doing physical activity?
6. Yes   No Do you lose your balance because of dizziness or do you ever loss consciousness?
7. Yes   No Do you have a bone or joint problem (for example, back, knee, or hip) that could be made worse by a change in your physical activity?
8. Yes   No Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
9. Yes   No Do you know of any other reason why you should not do physical activity?

If you answered YES to any of the questions, you must first obtain a doctor’s written permission to engage in physical activity. We encourage you to participate in the study, but we will require a written permission slip from your doctor.
APPENDIX C
INFORMED CONSENT
CONSENT FOR PARTICIPATION IN SOCIAL AND BEHAVIORAL RESEARCH


Protocol number: _____

Principal Investigator: Rick Petosa

I consent to my participation in research being conducted by Rick Petosa of The Ohio State University and his/her assistants and associates.

The investigator(s) has explained the purpose of the study, the procedures that will be followed, and the amount of time it will take. I understand the possible benefits, if any, of my participation.

I know that I can choose not to participate without penalty to me. If I agree to participate, I can withdraw from the study at any time, and there will be no penalty.

I understand that I will be randomly assigned to groups. I have been informed that both groups receive the same incentives and the same contact with researcher, but the content for each group varies in focus.

I have had a chance to ask questions and to obtain answers to my questions. I can contact the investigators at: 688-8648. If I have questions about my rights as a research participant, I can call the Office of Research Risks Protection at (614) 688-4792.

I have read this form or I have had it read to me. I sign it freely and voluntarily. A copy has been given to me.

Print the name of the participant:

_____________________________________________________

Date: __________________________  Signed: ______________________

(Participant)

Signed:

(Principal Investigator or his/her authorized representative)

Signed:

(Person authorized to consent for participant, if required)

Witness:

________________________________

(When required)
APPENDIX D

EXAMPLE OF A LOG
WEEK 1

Goal Setting
Instructions: These questions are designed to help you make realistic goals. Answer each question.

What exercise do you plan to perform (example: walking, jogging, biking)?

What pace do you plan to exercise? Slow  Medium  Fast

How many minutes/per day do you plan to exercise? _________ minutes/day

Where do you plan to exercise? (example: at home, in the neighborhood)

What days do you plan to exercise? (example: Mon, Tues) ___________

What time of day do you plan to exercise? (example: after dinner, at 4:00) __________

Exercise Log:
Instructions: Record activity (Example: walking, jogging); pace (slow, medium, fast), and how many minutes (Example: 20 minutes)

<table>
<thead>
<tr>
<th>Example Date:</th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
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</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Walking</td>
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<tr>
<td>Pace</td>
<td>Medium</td>
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</table>
WEEK 2

Goal Setting
Instructions: These questions are designed to help you make realistic goals. 
Answer each question.

What exercise do you plan to perform (example: walking, jogging, 
biking)?_________________

What pace do you plan to exercise?    Slow   Medium  Fast
How many minutes/per day do you plan to exercise?
              minutes/day

Where do you plan to exercise? (example: at home, in the neighborhood)

What days do you plan to exercise? (example: Mon, Tues) _____________

What time of day do you plan to exercise? (example: after dinner, at 4:00) __________

Exercise Log:
Instructions: Record activity (Example: walking, jogging); pace (slow, medium, fast), 
and how many minutes (Example: 20 minutes)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Example Date</th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Walking</td>
<td></td>
<td></td>
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<tr>
<td>Pace</td>
<td>Medium</td>
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APPENDIX E

TAKE CONTROL WORKSHEETS
Worksheet 1: Take Control: Creating your Personal Exercise Plan

PURPOSE: Design an Exercise Program based on your personal preferences.

Exercise should be fun. When you choose an exercise that you enjoy, you are more likely to keep doing it. The following questions will help you determine the right kind of activity or exercise for you. With this information, you should be able to design an exercise program that you will enjoy.

Step 1. Exercise Preferences: Please circle answer that best describes your personal exercise preferences.

I like to exercise:    alone    with a friend(s)    in a group
I like to exercise at a:    light pace    medium pace    hard pace
I prefer to exercise at:    home    outdoors    in a gym
I like to exercise during the:    morning    afternoon    evening
I like exercise involving:    competition    cooperation    neither
I like exercise involving:    low skill (walking)    medium skill    High skill
I like exercise that is:    relaxing    stimulating    demanding

Step 2.
List other personal preferences of Exercise: ______________________________
_____________________________
_____________________________
Step 3. This list of exercise types will help you identify types of activities you enjoy doing. By identifying which activities you like and by varying them from day-to-day, you will be more likely to maintain an active lifestyle. Please put an “X” next to the activities you enjoy or would like to try.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th></th>
<th>ACTIVITY</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step Aerobics</td>
<td>X</td>
<td>Jump Rope</td>
<td></td>
</tr>
<tr>
<td>Dance Aerobics</td>
<td></td>
<td>Rollerblading</td>
<td>X</td>
</tr>
<tr>
<td>Pilates</td>
<td></td>
<td>Run/Jog</td>
<td></td>
</tr>
<tr>
<td>Yoga</td>
<td></td>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td>Bicycling</td>
<td></td>
<td>Sports (basketball..)</td>
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<tr>
<td>Calisthenics</td>
<td></td>
<td>Softball</td>
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<tr>
<td>Aerobic Machine</td>
<td></td>
<td>Swimming</td>
<td></td>
</tr>
<tr>
<td>Weight Lifting</td>
<td></td>
<td>Tennis</td>
<td>X</td>
</tr>
<tr>
<td>Dance</td>
<td></td>
<td>Golf</td>
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<tr>
<td>Other:________</td>
<td></td>
<td>Other:________</td>
<td></td>
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</tbody>
</table>

Step 4. Now, make a list of different types of exercise that meet your preferences.
1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

Step 5. Complete Goal Setting for week 1.(see next page)

Step 6. Complete week 1 exercise log. (see next page)
Step 5: Goal Setting For Week 1
Instructions: These questions are designed to help you make realistic goals.
Answer each question.

What exercise do you plan to perform (example: walking, jogging, biking)?
What pace do you plan to exercise? Slow Medium Fast
How many minutes/per day do you plan to exercise? _________ minutes/day
Where do you plan to exercise? (example: at home, in the neighborhood)

What days do you plan to exercise? (example: Mon, Tues) ____________
What time of day do you plan to exercise? (example: after dinner, at 4:00) __________

Step 6: Exercise Log:
Instructions: Record activity (Example: walking, jogging); pace (slow, medium, fast),
and how many minutes (Example: 20 minutes)

<table>
<thead>
<tr>
<th>Activity</th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
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<td>Medium</td>
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<td>30 minutes</td>
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</tbody>
</table>

Weekly Evaluation: What types of exercise did you find most enjoyable?
What exercises do you think you could continuously participate in?
Worksheet 2: Change your Environment and Find your Exercise Comfort Zone

**Purpose:**
1. Arrange your environment to support regular exercise.
2. Identify your personal “comfort zone” for exercise to increase enjoyment.

**Environment Change to Take control of your Exercise**

**Step 1.** Read the list of Environmental strategies listed below. Each method is designed to help you stick to your program. There are many ways you can change your environment to influence your exercise program.

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**Cues:** place motivational signs, pictures, exercise reminders or exercise logs in hard to ignore place in your daily environment. Examples include: bathroom mirror, refrigerator door, and desk.

**Exercise Equipment:** place exercise equipment (exercise bike, treadmill, barbells,) in attractive and hard to ignore places in your home. Another example is to put your gym shoes or packed gym bag next to the front door.

**Exercise Identity:** join an exercise group and take an active role in the group. In Columbus there are walking, running, and bicycling organizations. (See Neighborhood Exercise Resources in supplemental materials) Taking on an active role in such a group can help you identify yourself as a regular exerciser.

**Desirable Environments:** actively seek out places to exercise that you find attractive and enjoyable. Some people like parks and natural settings. Others like the safety of exercise trails. Some like the air conditioned comfort of a shopping mall or fitness club.

**Convenient Environments:** For some convenience is a major concern. Generally these folks don’t have time to travel to exercise. It may help to plan walking, running, bicycling routes from the from door of your home through your immediate neighborhood. (see walking map in supplemental materials).

**Enhanced Environments:** some people watch television or listen to music while exercising. Generally these folks use stationary exercise equipment (treadmills, stationary cycles, weight machines, etc). But there are many forms of portable music players.

**Step 2:** list some environmental changes you would be willing to experiment with this week.

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**Step 3:** add these environmental changes to your exercise goal for the week. Go on to next page.
Find your Exercise Comfort Zone

Some people believe you have to exercise very hard for health benefits. This is not true. The most important part of exercise is being consistent. Getting 3 to 5 days of planned exercise a week for many years is the key to health benefits.

Finding your “comfort zone” is useful for sticking with your exercise program long-term. Your “comfort zone” is reached when your rate of breathing has gone up, but you are comfortable. The key is to find a pace that is enjoyable and can be maintained for 20 minutes or more.

The following activity is designed to help you find your comfort zone. All you will need for this activity is a watch and a place to walk / jog.

**Step 4:** Walk / jog at different speeds and rate your level of comfort at each pace.

*Stop the activity when you have identified the speed at which you feel most comfortable.*

1. **Walk slowly** for at least 5 minutes, rate your comfort.

<table>
<thead>
<tr>
<th>Too Easy</th>
<th>Easy</th>
<th>Comfortable</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
</table>

2. **Walk at a medium pace** for 5 minutes, rate your comfort.

<table>
<thead>
<tr>
<th>Too Easy</th>
<th>Easy</th>
<th>Comfortable</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
</table>

3. **Walk as fast as you can** for 5 minutes, rate your comfort.

<table>
<thead>
<tr>
<th>Too Easy</th>
<th>Easy</th>
<th>Comfortable</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
</table>

4. **Jog at a slow speed** for 5 minutes, rate your comfort.

<table>
<thead>
<tr>
<th>Too Easy</th>
<th>Easy</th>
<th>Comfortable</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
</table>

5. **Jog at a medium** speed for 5 minutes, rate your comfort.

<table>
<thead>
<tr>
<th>Too Easy</th>
<th>Easy</th>
<th>Comfortable</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
</table>

**Key Point:** Always exercise at a comfortable pace so that you enjoy the experience. Some days you may feel better and go a little faster, other days a little slower. Over time your comfort level pace will increase. The goal is to stick with it. Enjoy your exercise.

**Step 5:** Add exercise pace for comfort to your exercise Goal Setting for Week 2.

**Step 6:** Complete week 2 Exercise Log.
Step 2: Goal Setting For Week 2

What exercise do plan to perform? _______________________
What comfort level (or pace) do you plan to exercise? Slow   Medium   Fast
How many minutes/day do you plan to exercise? ________ minutes/day
Where do you plan to exercise? _______________________
What days do you plan to exercise? _________________
What time of day do you plan to exercise? ____________
List the environmental changes you are going to use this week? ______  _______

Step 3: Weekly Exercise Log. Record activity, pace, and minutes

<table>
<thead>
<tr>
<th>Activity</th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
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</thead>
<tbody>
<tr>
<td>Pace/Comfort Zone</td>
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<td>Minutes</td>
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</table>

Environmental Changes

Weekly Evaluation:

Were you able to exercise at this comfort zone consistently throughout the week?

How did you adjust your pace to make exercising more enjoyable?
**Worksheet 3: Overcoming Barriers to Regular Exercise**

**Purpose:** develop a plan for overcoming barriers to regular exercise.

Understanding barriers to regular exercise and creating plans to overcome barriers will help you make exercise part of your daily life. Barriers can be different for everyone. For example, work, family, and friends can affect your level of exercise if they require too much of your time. The purpose of this lesson is to identify ways to overcome your barriers to regular exercise.

**Step 1.** Read the list of barriers to regular exercise and solutions chart on the next page.

**Step 2.** On the chart below, list each of your barriers to exercise and a plan of action for overcoming barriers.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Plan of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

**Step 3.** Complete Goal Setting for week 3.

**Step 4.** Complete week 3 exercise log.
<table>
<thead>
<tr>
<th>Barriers to Regular Exercise</th>
<th>Solution</th>
</tr>
</thead>
</table>
| No time to exercise        | 1. Get up a little earlier in the morning and exercise before work.  
2. Take a walk on your lunch break.  
3. Take the stairs whenever possible.  
4. If feasible, walk or bike to work.  
5. Walk your kids to school rather than drive them. |
| Lack motivation             | 1. Set realistic goals.  
2. Chart your progress.  
3. Exercise with a friend.  
4. Reward yourself when you achieve short-term goals.  
5. Add variety/try something new. |
| Do not find exercise enjoyable | 1. Try something new. Experiment with different activities until you find one you really like.  
2. Have fun! Playing with your kids is exercise too. Run, skip, and jump rope with them.  
3. Listen to music while you exercise.  
4. Exercise with a friend. |
| Find exercise boring        | 1. Change the scenery. Exercise outside for something different, or try an exercise class.  
2. Listen to music while you exercise.  
3. Exercise with a friend.  
4. Try something different. A new class or video might do the trick. |
| Lack self-confidence        | 1. Start with what you know. If you want to run but unsure whether you can do it, start with walking at a comfortable pace. Then, gradually increase you pace and distance. When you are comfortable with a brisk walk, try jogging for one minute, then two minutes, etc.  
2. Exercise with a friend you will encourage you.  
3. Practice at home before joining a class. |
| Fear of injury              | 1. Refer to the resource packet given to you in week 1, where you will find information about injury prevention.  
2. Start slow. If you are new to exercise, start at a pace that is comfortable for you and gradually increase the intensity.  
3. When taking a class, make sure your instructor is certified. Certified instructors are knowledgeable about injury prevention and can also address any questions or concerns you might have. |
| Lack self-management skills | 1. Practice writing goals. Refer to lesson one.  
2. Keep track of how you are doing. When you exercise, write it down, keeping track of the type of exercise you did and how long you exercised.  
3. Reward yourself when you achieve short-term goals. |
| Lack support from family and friends | 1. Ask a friend or family member to support your efforts to exercise by encouraging you and cheering you on.  
2. Ask a family member to take over household responsibilities and/or childcare for you so that you can exercise.  
3. Involve the whole family. Exercising as a family can be fun and enjoyable for everyone and it is a great way to support one another. |
Step 3: Goal Setting For Week 3

What exercise do you plan to perform? 
What pace do you plan to exercise?  Slow  Medium  Fast
How many minutes/day do you plan to exercise? _______ minutes/day
Where do you plan to exercise? ________________
What days do you plan to exercise? _____________
What time of day do you plan to exercise? __________
What plan of action will you use this week to overcome barriers?

Step 4: Exercise Logs.  Record activity, pace, minutes, and the plan of action

<table>
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<tbody>
<tr>
<td>Steps per day</td>
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<td>Plan of Action</td>
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Weekly Evaluation:
Was your plan of action effective in helping you overcome your barriers for exercise?
Worksheet 4: Time Management for Regular Exercise

Purpose: construct a personal time management plan for exercise.

“Lack of time” is the most common reason people give for lack of regular exercise. Time management can help you make time for exercise. First you have to see how you spend your time. By completing a schedule which includes your daily responsibilities plus a regular appointment for physical activity, you will be able to take control of your exercise.

Step 1: Record your daily events and responsibilities on the weekly schedule sheet (next page). Include all of the activities that take up your time: work, travel time, childcare, housekeeping, yard work, meals and even sleeping.

Step 2. On the schedule sheet identify the times of day when it would be most convenient to exercise. Consider the times when you are most tired or would be likely to cancel your exercise appointment. If you are most energetic in the morning, then you could go to bed earlier so that you can get up before work and walk.

Step 3. Based on your time management plan, complete the week 4 goal setting.


It may be helpful to experiment with exercise “appointments” at different times of the day. Eventually you will find the best time for you to exercise regularly.
# Weekly Schedule

<table>
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<tr>
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<th>MON</th>
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</tbody>
</table>
Step 3: Goal Setting For Week 4

What exercise do plan to perform? ____________________
What pace do you plan to exercise?  Slow  Medium  Fast
How many minutes/day do you plan to exercise? _________ minutes/day
Where do you plan to exercise? ________________
What days do you plan to exercise? _____________
What time of day do you plan to exercise? __________

Step 4: Exercise Logs: Record activity, pace, and minutes

<table>
<thead>
<tr>
<th></th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
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</thead>
<tbody>
<tr>
<td>Steps/Day (optional)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Activity</td>
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<tr>
<td>Pace</td>
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<td>Minutes</td>
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</tr>
</tbody>
</table>

Weekly Evaluation: If you did not keep a physical activity appointment, what were your reasons?

What changes do you need to make in your time schedule to exercise regularly?
**Worksheet 5:**  
**Support from Family and Friends**

**Purpose:** To help you obtain social support from family and friends

This week, your goal is to see what kind of support your friends, family and peers can give you to help you on your way to becoming more physically active. Making these people aware of your commitment and asking them to support you in different ways can help you maintain your physical activity program. Try to find at least one person that can help you in each of the following areas and fill out the boxes below each area.

**Step 1: Exercise Buddy**  
An exercise buddy can add incentive, excitement and safety to your workout. Ask a family member or friend to exercise with you on a regular basis.

<table>
<thead>
<tr>
<th>Person</th>
<th>How often will they exercise with you</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Step 2: Time Relief**  
Ask a family member or friend to help you make time to exercise. This could mean taking over some domestic responsibilities or childcare.

<table>
<thead>
<tr>
<th>Person</th>
<th>What they did to give you more time to exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**Step 3: Encouragement**  
Simply ask a family member or friend to give you encouragement while you continue your exercise program.

<table>
<thead>
<tr>
<th>Person</th>
<th>What they did to encourage you</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
**Step 4: Complete Goal Setting for Week 5**

**Step 5: Complete the Exercise Log for Week 5**

### Step 4: Goal Setting for Week 5

What exercise do you plan to perform? __________________
What pace do you plan to exercise? Slow    Medium    Fast
How many minutes/day do you plan to exercise? _________ minutes/day
Where do you plan to exercise? ________________
What days do you plan to exercise? _________________
What time of day do you plan to exercise? _____________
Who is your exercise buddy? _________________
Who is going to provide time release? ________________
Who is going to provide encouragement? _________________

### Step 5: Exercise Logs. Record activity, pace, and minutes

<table>
<thead>
<tr>
<th></th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
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<tbody>
<tr>
<td>Steps per Day (optional)</td>
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<td>Activity</td>
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</table>

Which kind of support did you find most useful?

How can you use these people to help you continue your physical activity program and become more active?
Worksheet 6. Keep Exercising: Long Term Planning

Purpose: To develop a long-term exercise plan using all of the skills found useful.

The longer you are active, the more health and fitness benefits you will enjoy. But sticking with your exercise program is a challenge. The keys to success are:

a. Long-Term Planning
b. Effective Problem Solving

Step 1. On the page 3 is the Take Control Program Skill List. Under each skill is a set of suggestions regarding the application of the skill to your exercise program. Please take some time to review the list before completing the items below.

Step 2: Rate how useful each skill was in helping you stick with your exercise program.

<table>
<thead>
<tr>
<th>Rate Usefulness of each Skill to You</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Goal Setting</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Exercise Logs</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Using Comfort Zone to Pace your exercise</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Identifying Personal Exercise Preferences</td>
</tr>
<tr>
<td>low</td>
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<tr>
<td>high</td>
</tr>
<tr>
<td>Identifying Barriers to Exercise</td>
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<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Strategies to Overcome Barriers</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Time Management for Exercise</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>high</td>
</tr>
<tr>
<td>Using Social Support for Exercise</td>
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<tr>
<td>low</td>
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<tr>
<td>high</td>
</tr>
<tr>
<td>Environmental Changes</td>
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<tr>
<td>low</td>
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<tr>
<td>high</td>
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</tbody>
</table>

Go to next page for Step 3
Step 3. Under each skill, list how you will use each of the skills in the future to stick with your exercise plan.

Goal setting: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Exercise Logs: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Comfort Zone: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Exercise Preferences: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Social support: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Time management: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Overcoming barriers: How you will use the skill in the future:
____________________________________________________________
____________________________________________________________

Environmental Change: How you will use the skill in the future:
____________________________________________________________
Take Control Program Skills List

**Goal setting:** effective goal setting includes:
1. Goals should focus on exercise behavior.
2. Be specific about exercise type, day, time or day, pace etc.
3. Set realistic goals which emphasize your personal enjoyment.

**Exercise Logs:** are important for sticking with an exercise program because:
1. Logs help you evaluate weekly progress and identify barriers to exercise.
2. Logs increase your awareness of success.
3. Logs can help you solve problems in sticking with your exercise.

**Comfort Zone:** regular exercise is about feeling good. Care should always be taken to ensure that exercise type and pace are chosen to keep you in your comfort zone.
Some tips for staying in your comfort zone include:
1. Set weekly goals that describe the exercise pace.
2. Include ratings of comfort and enjoyment in your exercise logs.
3. Change your exercise type or pace if you are not in your comfort zone.

**Exercise Preferences:** there are many types of exercise activities.
1. use music, games, classes, etc. to keep you program fun and interesting.
2. mix different types of exercise to prevent boredom or burnout.
3. be aware of factors that increase your exercise enjoyment and use them.

**Social support:** some people enjoy exercising with others. Some people stick with an exercise program if family and friends provide support.
1. Carefully consider how your exercise program could benefit from social support.
2. Join an exercise class.
3. Determine if socializing during exercise makes it more fun.

**Time management:** exercising when you “have time” is rarely successful.
1. Make exercise appointments and stick to them.
2. Consider the time of day that exercising is most enjoyable.
3. Be flexible-managing time requires adapting to new circumstances.

**Overcoming barriers:** our hectic lifestyles create many barriers to regular exercise.
You might stick with you program for months only to be interrupted by an illness, injury, new job or family responsibility.
1. Keep a record of barriers to exercise in your logs.
2. Be flexible, plan for adjustments in your exercise.
3. Expect change and problem solve.

**Environmental Change:** actively changing your environment to make exercise easier to remember, more fun more convenient. Examples:
1. Place you exercise goals and logs on refrigerator, bathroom mirror or front door.
2. Use music or the environment to make exercise more enjoyable.
3. Find places to exercise that you really enjoy and look forward to.
Exercise Plan for Changing Seasons

Changing of the seasons brings weather that can interfere with your exercise program. Also changing seasons can bring different personal responsibilities or changing time schedules. Regular exercisers learn how to change their exercise routine to keep going in spite of these seasonal changes.

**Step 4.** Complete the table below to generate ideas on how you can adapt your exercise program to the changing seasons.

<table>
<thead>
<tr>
<th>Season</th>
<th>Exercises I like to Do</th>
<th>Best time of Day</th>
<th>Best Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td></td>
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</tr>
<tr>
<td>Fall</td>
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<td>Winter</td>
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<tr>
<td>Spring</td>
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</table>

Go to the next page for Step 5
Step 5. Based on your responses to the table write an exercise goal for each season of the year on the next page.

Summer Exercise Goal
Exercise Types:
How many minutes will you exercise?
Time of Day:
Days of the Week:
Location(s):

Fall Exercise Goal
Exercise Types:
How many minutes will you exercise?
Time of Day:
Days of the Week:
Location(s):

Winter Exercise Goal
Exercise Types:
How many minutes will you exercise?
Time of Day:
Days of the Week:
Location(s):

Spring Exercise Goal
Exercise Types:
How many minutes will you exercise?
Time of Day:
Days of the Week:
Location(s):

Step 6: Write your exercise goal for week 6
Step 7: Complete week 6 exercise log.

Congratulations! You have completed the Take Control Exercise Program. Hopefully you are 6 weeks into an exercise program that will last a lifetime.

The key to success is to continually adjust your program each week to keep exercise enjoyable.

Neighborhoods on the Move staff member will contact you to complete a program evaluation. The evaluation is a paper and pencil survey that will take about 15 minutes to complete. You will receive $10.00 to complete this survey. Your responses to this survey are important. This information will enable us to improve the program.
Goal Setting for Week 6

What exercise do you plan to perform?_________________
What pace do you plan to exercise? Slow    Medium    Fast
How many minutes/day do you plan to exercise? _________ minutes/day
Where do you plan to exercise? ________________
What days do you plan to exercise? ______________
What time of day do you plan to exercise? __________

Exercise Logs. Record activity, pace, and minutes

<table>
<thead>
<tr>
<th>Activity</th>
<th>MON</th>
<th>TUES</th>
<th>WED</th>
<th>THURS</th>
<th>FRI</th>
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<th>SUN</th>
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<td>Pace</td>
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<td>Minutes</td>
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</table>

How does your activity change with the seasons?

How can you overcome extreme cold or extreme heat?
APPENDIX F

PACKET INFORMATION
American Heart Association: Just Move

Congratulations! By participating in this course on self-control of exercise you have taken a first step to improve your health and fitness. This course is designed to help you develop skills to:

1. Identify the Types of Exercise Best for You.
2. Take control of your exercise program to become a life-long exerciser.

Exercise is important for everyone. The single most important thing everyone can do for their health is participate in regular physical activity. Regular Exercise can help you feel and look better. Not only does fitness improve but you can reduce your risk of chronic diseases. Vigorous exercise like running is not necessary to get these health benefits. Moderate forms of exercise, such as walking can produce health benefits.

The single most important factor in exercising for health is consistency over time. Decisions about your personal exercise program should focus on what will help keep you exercising regularly for years to come.

How to Participate:

The American Heart Association’s “Just Move” program is designed to teach you skills to design and maintain your own exercise program. There is evidence that this approach will help you become a regular exerciser. The “Just Move” program is designed to be convenient for you:

1. A “Neighborhoods on the Move” staff member will visit your home or neighborhood three times over the course of the program.
2. At the beginning and in the middle of the program you will receive a brochure a set of logs to be completed. You are to return the logs to the staff member at the designated date.

Benefits of the “Just Move” Program

1. The Program is being offered to members of your Neighborhood free of charge.
2. You will receive incentives for participation (pedometer, hand weights, etc.)
3. You will receive $10.00 for completing a post-test evaluating the program.
4. You will receive $10.00 for completing a follow-up test evaluating the program.
5. You will learn skills useful in becoming a life-long exerciser.

If you have questions or would like assistance simply call Neighborhoods on the Move at 688-8648, ask for the Take Control -American Heart Association’s “Just Move” Program.
Take Control: Personal Exercise Program

Congratulations! The “Take Control Exercise Program” will improve your health and fitness. This program will help you:

- Identify the types of exercise best for you.
- Take control of your exercise program to become a life-long exerciser.

Who is the Take Control Program For?

This program is designed for everyone. It does not matter if you:

1. have never exercised before
2. used to exercise and have stopped
3. currently exercise
4. are a weekend warrior
5. are a competitive athlete

Exercise is important for everyone. The single most important thing everyone can do for their health is participate in regular physical activity. Regular Exercise can help you feel and look better. Regular exercise will improve your fitness and will reduce your risk of illness. Vigorous exercise like running is not necessary to get these health benefits. Moderate forms of exercise, such as walking can also produce health benefits.

The critical factor in exercising for health is consistency over time. Decisions about your personal exercise program should focus on what will help keep you exercising regularly for years to come. Setting weekly goals, keeping exercise logs, using motivation techniques and keeping exercise fun will help you exercise consistently over time.

The key issue for everyone is long-term consistency. Most people should exercise daily their whole lives. This program can help you become a regular, consistent exerciser.

Benefits of the Take-Control Program

1. You will learn skills for “Taking Control” of your exercise program.
2. You will learn how to regularly adjust your exercise program to keep it enjoyable.
3. You will learn how to become a life-long exerciser.
4. The Program is being offered to members of your Neighborhood free of charge.
5. You will receive incentives for participation (pedometer, hand weights, etc.)
6. You will receive $10.00 for completing a post-test to evaluate the program.
7. You will receive $10.00 for completing a follow-up test to evaluate the program.
TAKE CONTROL: EXERCISE PROGRAM APPROACH

The “Take Control Program” is based on the idea that you are the “expert” best able to design your exercise program. The program covers skills that will help you continuously adjust your exercise program to your personal needs and preferences. The diagram below illustrates how the program works.

1. Take Control Program Skill
2. Set Weekly Exercise Goal
3. Exercise and Keep Log
4. Adjust Exercise Plan

Each week, a lesson covers “Take Control” skills. You apply that skill to your exercise program by setting a weekly exercise goal. During the week you exercise and keep an exercise log so that you can evaluate how useful each skill is for you. At the end of each week you adjust your plan by keeping useful skills and dropping methods that are not helpful. By the end of the course you have designed and optimized your own personal exercise program. Most important, you have learned how to continuously evaluate and adjust your program. When circumstances change (examples: family or work responsibilities, illness, changing seasons) you can make adjustments to keep your exercise program going.

Over six weekly lessons the following skills will be covered:
1. Exercise Goal Setting
2. Maintaining Exercise logs
3. Using Exercise Comfort Zone to Pace your exercise
4. Identifying Personal Exercise Preferences
5. Identifying Barriers to Exercise and using strategies to overcome barriers
6. Time Management for Exercise
7. Using Social Support for Exercise
8. Planning for Exercise across Seasons
9. Environmental Changes to support Exercise
How to Participate in the Take Control Exercise Program

The Take-Control Program is designed to teach you skills to design and maintain your own exercise program. There is evidence that this approach will help you become a regular exerciser. The Take-Control program is designed to be convenient for you. Here is how the program works:

1. Each week a “Neighborhoods on the Move” staff member will visit your home or neighborhood to drop-off a lesson and to pick up the prior weeks exercise log.

2. Each week you complete one lesson. In the lesson you set a weekly exercise goal and complete an exercise log. Each lesson asks you to “try out” a new technique.

3. A staff member will come by each week to pick up your completed materials and leave you with individualized suggestions/support on the prior lesson.

4. You can call Neighborhoods on the Move at 688-8648, to ask for personal advice/suggestions while you complete the lessons of the Take Control Program.

5. Neighborhoods on the Move runs a web site that is full of resources to help you stick with your program. The site address is http:\\education.osu.edu\paes\nom\). This site is a resource for you to use but is optional, you can complete the course without using the website.

If you have questions or would like assistance simply call the Neighborhoods on the Move at 688-8648, ask for the Take Control Program.

Following this introduction are a set of supplemental materials. These materials include:

1. Recommendations for Levels of Exercise
2. Types of Physical Fitness
3. Maintain your healthy Weight for Life
4. Injury Prevention
5. Neighborhood Resources for Exercise
6. Neighborhood Walking Map

These materials are designed to be used as reference sources to be used when completing the lessons.

Getting Started: Lesson 1 is located in the left hand pocket of your folder. Complete the steps listed on the lesson and have fun exercising.
Types of Fitness

Your “level of fitness” can be measured in many different ways. Listed below are just three of the many components of physical fitness. You can focus on one or all of these types of fitness in your physical activity program. Sticking to your exercise program for an extended period of time will help you maintain your health and fitness.

Aerobic Fitness
Your heart and lungs are healthy and fit when they can supply your muscles with blood and oxygen for long periods of time. Aerobic fitness can be improved by doing aerobic activities such as riding a bike, briskly walking, or jogging for at least 20-30 minutes.

Strength Training
Strength is measured by the amount of weight a muscle can lift. Strength is improved by lifting weights, by performing balancing activities, Yoga, and calisthenics.

Flexibility
Flexibility is important to prevent injury and to improve performance. Stretching before and after physical activity can increase your flexibility and relax your muscles.
Recommended Levels of Exercise

Depending on your goals and the results that you want to achieve, the amount and intensity of exercise you need to engage in will vary.

To lose weight or maintain weight, one might adhere to the ACSM guidelines for weight loss. The ACSM recommends exercising at a moderate intensity for 60 minutes, 5 days a week. Suggested activities include a brisk walk, or biking.

To improve fitness levels one might want to try to adhere to more vigorous activity. The American College of Sports Medicine (ACSM) recommends exercising 60-85% of your target heart rate, 3 times a week for 20-30 minutes per session. Suggested activities could include: aerobic classes; elliptical machine, jogging, and stair stepping.

To reduce chronic diseases, to improve sleep habits, to reduce stress, to improve energy levels, and to feel less tired, there are many options to meet these reasons. One may increase moderate activity for 30 minutes, on most if not all days of the week. Suggested activities include a brisk walk.

To improve muscle definition, one might want to try to adhere to weight training guidelines. The ACSM recommends engaging in strength training 2-3 times a week. Suggested activities include: pilates, free weight training, weight machines, floor exercises, and calisthenics.

Sample Goals Specific to an American College of Sports Medicine recommendation

You may need to start at a lower level and work up to the recommendation.

**IMPROVED FITNESS LEVELS**
Goal: I will run for 30 minutes, 3 days.

**IMPROVED MUSCLE DEFINITION**
Goal: I will weight train consistently for 2-3 times per week.

**LOSE WEIGHT OR MAINTAIN WEIGHT**
Goal: I will walk at a medium to brisk pace for 60 minutes, 5 days a week.

**GENERAL HEALTH BENEFITS**
Goal: I will engage in moderate activity (such as walking) for 30 minutes, 5 days/week.
Maintain Your Healthy Weight for Life:  
The Keys to Lifelong Change and Long-term Success

This section is designed to help give you helpful hints on how to maintain a healthy weight.

Key 1: Focus on your long-term goals. It is not what you do for the next 6 weeks or 6 months that counts, but what you continue to do over your lifetime -- including healthy eating, regular exercise, and maintaining a positive attitude -- that determines your ability to maintain a healthy weight over time.

Key 2: Develop a positive self-image. Don’t get in the rut of thinking, “If I lose 30 lbs, then I’ll be happy with myself.” Instead, practice being proud of your efforts and the progress you’ve made up to this point.

Key 3: Learn to play again. If you think of exercise as drudgery, it won’t become part of your healthy lifestyle. So take a tip from what children already know – activity is fun! Take a bike ride, play games with your children, take a dance class, or join a softball or basketball league. Rediscover the joy of play and you’ll soon find that there are many activities that aren’t just exercise, they are actually fun too.

Key 4: Get stronger. Incorporating resistance training into your exercise routine by using weights, machines, and elastic bands will help you maintain good posture and reduce your risk of osteoporosis (weak bones). Strength training just two times per week also produces stronger muscles that burn more calories, even when you’re at rest.

Key 5: Combine healthful eating with physical activity. If you would like to make changes to your diet, a registered dietician can help. The following websites also provide useful nutrition and weight management information:

- U.S. Department of Agriculture, Food & Nutrition Information Center:  www.nal.usda.gov/fnic/
- The New American Plate:  www.aicr.org/nap2.html
- Interactive Healthy Eating Index:  http://147.208.9.133/

(adapted from the Idea Health & Fitness Association, “Get Real” newsletter, Daniel Kosich, PhD, Copyright © 2004.)

10 ways to burn 100 calories

1. Cycling (10 minutes)  
2. Video workout, such as aerobics (10-15 minutes)  
3. Walking (15 minutes)  
4. Skipping (15 minutes)  
5. Jogging (15 minutes)  
6. Climbing stairs (15-20 minutes)  
7. Dancing (20 minutes)  
8. Housework (20 minutes)  
9. Washing the car (20-30 minutes)  
10. Gardening (25-30 minutes)
Injury Prevention

To maintain an active lifestyle, it is important to know how to avoid injuries. The following guidelines will help you to prepare for and participate in safe physical activities.

Warm-up
Before you participate in activity you should engage in a warm-up period. A warm-up period includes about 10 minutes of light activity that is designed to get the body ready for exercise. An example of a warm-up activity would be walking.

The benefits of warming up include:
1. An increase in heart rate so that the body is prepared for exercise
2. Relaxes tense muscles
3. Increased blood flow to the muscles that you will be using to exercise
4. Increased joint and muscle flexibility

Stretch
After you finish the warm-up, you should stretch your muscles. Here are a few tip for proper stretching:
1. Stretch your muscles after your warm up exercises
2. Only stretch a muscle to the point of mild discomfort. If it hurts, you're pushing too hard
3. Hold the stretch for 10 to 30 seconds & do not bounce
4. Breathe normally as you stretch

Gradually Increase Your Activity Level
Consult your doctor before beginning an exercise program. A physician will be able to guide you and suggest the appropriate exercise routine according to your health history. Start exercising slowly and build up the intensity and amount of time you exercise over several weeks.

Listen to Your Body
When exercising, if you experience pain, are lightheaded, dizzy, and weak or feel faint, stop immediately! If these symptoms continue, consult your doctor or health professional.

Be Prepared for the Weather
On hot days, wear light colored, loose fitting clothing. Do not exercise outdoors during the hottest part of the day, 11 am-3 pm. Drink plenty of water before, during and after you exercise. On cold days, wear multiple thin layers instead of one heavy layer of clothing. This will help to trap the warm air between your clothing layers and between your clothing and skin. Wear gloves and a hat to avoid losing body heat while exercising.

Cool-down
It is important to cool your body down after exercising. It helps to slowly return your heart rate, breathing and blood pressure to normal. It also improves flexibility and helps to reduce the risk of injury. Suggestions for your cool-down routine include:
1. Your cool down should last several minutes
2. Taper off the activity you were performing. For example, if you have been running, cool down by slowing down to a jog then a brisk walk for a few minutes
3. Stretch for 10 or more minutes following your cool-down
Other Tips
1. When engaging in a contact sport or an activity such as rollerblading, always wear protective equipment such as helmets, elbow and knee guards, and mouth guards.
2. Some activities involve jumping or pounding that may be uncomfortable or can lead to injury. Swimming, cross country skiing, in-line skating, cycling, and rowing are easier on the joints.
3. Know your physical capabilities.
4. Get plenty of rest following exercise and activity.
Neighborhood Exercise Resources

“Neighborhood Exercise Resources” is designed to be used with the packet. This section provides a resource guide for opportunities in the community to help you become more active. The resource guide is categorized according to topic (such as bicycling, fitness, outdoor activities, etc.)

BICYCLING
Baer Wheels
Bicycle repairs and sales.
www.baerwheels.com
3030 North High Street
Columbus, OH 43202
Phone: (614) 267-7178
Hours: M-F 10am-8pm; Sat 10am-6pm

Bike Source
Offer a wide selection of bicycles for different people and uses and provide expert assistance in selecting the proper bike type and model.
www.bikesourceonline.com
2887 N High St
Columbus, OH 43202
Phone: (614) 262-4998
Hours: M-F 10am-8pm; Sat 10am-6pm; Sun 12-4pm

Once Ridden Bikes
Sell bicycles, parts, and accessories. Will buy bicycles, perform maintenance and will special order parts, accessories, or bikes.
http://www.onceriddenbikes.com/
2489 Indianola Ave.
Columbus, OH 43202
Phone: (614) 447-9997
Hours: M-Sat 10am-6pm

DANCE
Central Ohio Dance Academy
Offer a variety of dance classes. Call for more information.
4366 Indianola Ave.
Columbus, OH 43214
Phone: (614) 262-2613

Columbus Folk Dancers
International Folk Dancing for recreation. Dancing Wednesday nights at 7:30 at Saint Stephen’s.
http://www.geocities.com/cfd4folkdancing/
Saint Stephen’s Episcopal Church
30 W. Woodruff
Columbus, OH 43210
Phone: (614) 262-7248 (Ask for Leslie)
Columbus Youth Ballet Academy
Focus on developing an appreciation of ballet within the community.
www.columbusyouthballet.com
5076 N. High St.
Columbus, OH 43214
Phone: (614) 433-7090

English Country Dancers of Columbus
See website for contact info and dance schedule. $3.00 per visit, first time is free.
http://www.bigscioly.com/english.html
Saint Stephen’s Episcopal Church
30 W. Woodruff
Columbus, OH 43210

Hillel Israeli Folk Dancing
International and Israeli dancing Tuesday nights 8pm-11pm (except for holidays).
http://www.amazingstocks.com/hillel.html
46 E. 16th Ave.
Columbus, OH 43201
Phone: (614) 294-4797

Jimmy Rawlins Dance Studio
Classes in swing, foxtrot, waltz, and tango. Call for class schedule and registration.
3383 North High Street
Phone: (614) 262-3279

The Whetstone Folk Dancers
Dancing Thursday evenings from 7:30-10 at the Whetstone Recreation Center.
http://www.geocities.com/whetstonefolkdancers/
Whetstone Recreation Center
3923 North High Street
Columbus, OH 43214
Phone: Betty Searles (Program Director) (614) 848-8321

FITNESS
Curves for Women
Fitness facility designed for women. "Permanent results without permanent dieting."
www.curvesinternational.com
3500 N. High St.
Columbus, OH 43214
Phone: (614) 263-0636
Hours: M-F 8:30am-12pm and 3:30-7pm, Sat 9am-12pm

Gold's Gym and Fitness Center
Activities include group exercise, personal training, cardiovascular equipment, spinning, pilates and yoga, while maintaining its core weight lifting tradition.
http://www.goldsgym.com/gymsites/us/oh/columbus/
3614 Indianola Ave.
Columbus, OH 43214
Phone: 614-262-GOLD (4653)
Hours: M-R 6:15am-11pm, F 6:15am-10pm, Sat 9am-8pm, Sun 10am-6pm
OSU Center for Wellness and Prevention
Wellness assessments, fitness memberships, weight management. Call for an appointment:
Monday-Friday 8am-5pm.
http://careconnection.osu.edu/hospitalsandservices/wellness/center/
2050 Kenny Rd.
Suite 1010
Columbus, OH 43221
Phone: (614) 293-2800

MARTIAL ARTS
Chinese Martial Arts Institute
Variety of different classes offered. Call to observe a class.
http://www.cmai.ws/TheSchool.asp
5082 North High Street
Columbus, Ohio 43214
Phone: (614) 841-0781

Columbus Center for Movement Studies: Aikido of Columbus
Classes offered in Aikido, Being In Movement, and Feldenkrais Awareness Through Movement.
http://www.being-in-movement.com/
3003 Silver Drive
Columbus, OH 43224
Phone: (614) 263-1111, (614) 262-3355
Fax: (614) 262-3355

Ho-I Tai-Chi & Shuai-Chiao Academy
Offer Kung Fu, Tai Chi, Women’s Kickboxing, Shuai Chiao and Chi Kung meditation classes. See website for class schedule. Observing classes recommended.
http://www.mastermatt.com/
2553 Indianola Ave.
Columbus, OH 43202
Phone: (614) 263-4701

Metro Martial Arts & Fitness
Karate, Self Defense, Personal Training for Adults and Children. First class free.
www.metro-martialarts-fitness.com
3347 N. High St.
Columbus, OH 43202
Phone: (614) 784-KICK (5425)
Classes offered: M-R 5:15-8:45pm, F 5:15-7:30 pm, Sat 10am-1:15pm

OUTDOOR ACTIVITIES
Columbus Outdoor Pursuits
Offer a variety of outdoor activities and more. Membership fee. See website for events and schedules.
http://www.outdoor-pursuits.org/
P.O. Box 14384
Columbus, Ohio 43214
Phone: (614) 442-7901
Godman Guild
Youth services, workforce development, and job success programs are available. Ropes course and adventure elements. Call for a reservation.
http://www.godmanguild.org/default.htm
Phone: (614) 885-1023, (614) 885-1446, (614) 294-5478
Email: youth@godmanguild.org

Northwood Park Garden Club
Gardening group that meets every month to discuss gardening and other issues.
http://www.northwoodpark.net/org.html
Email: northwoodpark@coollist.com

RECREATION

Black Sheep
Skateboard and skate shop.
www.netset.com/blacksheep
2153 North High Street
Columbus, OH 43201
Phone: (614) 294-9436
Hours: M-R 11am-8pm; F-Sat 11am-9pm; Sun 12-5pm

Columbus School of Skydiving
Offer a unique approach to First Jump and Advanced Skydiving Instruction.
www.skydivecolumbus.com
2587 North High Street
Phone: (614) 784-7799

The Ohio State University Department of Recreational Sports: Age Group & Camp Programs
Preschool, youth, teen, adult and swimming programs are offered.
http://www.ohiostaterecsports.org/program/agacp/index.htm
For information, contact:
Jill Anderson, Assistant Director
Phone: (614) 688-8787
Email: Anderson.1049@osu.edu

SPORTS
Columbus Sports Connection
Gym and aerobic classes.
http://www.columbussportsconnection.com/
4250 N. High St.
Phone: (614) 267-CLUB (2582)
Hours: M-R 5:30am-11pm, F 5:30am-10pm, Sat 8am-6pm, Sun 9am-6pm
Olympic Indoor Tennis, Inc.  
Tennis Club. Limited hours during the summer; call for information.  
3480 Indianola Ave.  
Columbus, OH 43214  
Phone: (614) 267-1213

Olympic Swim Club  
A family swimming pool.  
3450 Indianola Ave  
Columbus, OH 43214  
Phone: (614) 267-0503  
Hours: M-Sun 12-8:45pm

Sports Site Indoor Sports Facility  
An indoor soccer, roller hockey, and softball facility. Offer rentals, clinics and camps.  
http://www.sportsite.net/  
880 Henderson Road  
Columbus, OH 43214  
Phone: (614) 451-0022

The Ohio State University Outreach and Engagement: P-12 Project  
Over 100 youth and summer programs are offered.  
http://p12.osu.edu/index.php  
Arps Hall Room 185  
1945 N. High Street  
Columbus, OH 43210  
Phone: (614) 688-3621

Paraquip  
Skydiving school. Sell skydiving equipment.  
www.paraquip.com  
2587 N. High St.  
Phone: (614) 262-7903  
Hours: M-F 8am-5pm

Thompson Recreation Center  
Offer boxing, pre-school programs, African dance, indoor soccer, and more, open gym times. Must have Leisure Photo ID, which can be purchased at any Recreation Center (needed for Columbus City Pools).  
http://www.columbusrecparks.com/  
1189 Dennison Ave.  
Phone: (614) 645-3082  
Hours: T-F 1-10pm, Sat 9am-6pm

Tuttle Recreation Center  
Must have Leisure Photo ID, which can be purchased at any Recreation Center (needed for Columbus City Pools).  
http://www.columbusrecparks.com/  
240 W. Oakland Ave.  
Columbus, Ohio 43201  
Phone: (614) 645-3602  
Hours: T 1–10pm, W 3–10pm, R 1–10pm, F 1–10pm, Sat 9am–6pm
Whetstone Recreation Center
Must have Leisure Photo ID, which can be purchased at any Recreation Center (needed for Columbus City Pools).
http://www.columbusrecparks.com/
3923 North High Street
Phone: (614) 645-3217

YOGA & PILATES

Center for Wholeness
"Dedicated to holistic healing arts, sciences and education." Offer yoga, pilates, and movement arts.
http://www.cfwohio.org/
3408 Indianola Ave.
Columbus, OH 43214
Phone: (614) 784-8488

Columbus Nia
Classes offered at different locations. See website for details.
http://www.columbus.niasite.com/
**Part I. Self-Regulation**

People use various techniques to help them exercise on a regular basis. Recalling your exercise activities performed in the last four (4) weeks, please answer the following questions regarding techniques you may have used to help you exercise. If you did not exercise during this time period, select “never”.

In the scale provided next to each item, circle the number that best represents how often you used the specified technique in the past four (4) weeks.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>never</th>
<th>rarely</th>
<th>sometimes</th>
<th>often</th>
<th>very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I mentally kept track of my exercise activities.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>I mentally noted specific things which helped me exercise.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>I recorded my exercise activities in a written record.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
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<tr>
<td>4.</td>
<td>I recorded my exercise activities in a written record including duration or intensity of exercise performed.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>I kept a written record of specific methods used to enhance my ability to perform exercise.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
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</tr>
<tr>
<td>6.</td>
<td>I established short term goals (daily or weekly) related to how often I exercise.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
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<tr>
<td>7.</td>
<td>I established long term goals (monthly or longer) related to how often I exercise.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
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<tr>
<td>8.</td>
<td>I established goals for exercise time or distance (e.g. swim 20 minutes, run three miles).</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>I established exercise goals that focused on my health (e.g. improved fitness).</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>I established exercise goals that focused on my appearance (e.g. lose weight, tone body).</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11.</td>
<td>I established a written commitment with others to exercise.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I established an oral commitment with others to exercise regularly.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I mentally set exercise goals.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>I wrote down my exercise goals.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I exercise with someone to help me exercise regularly.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>16.</td>
<td>I exercised with a pet to help me exercise regularly.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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<tr>
<td>17.</td>
<td>I talked to someone while I exercised to help me exercise regularly.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>18.</td>
<td>I received verbal praise from someone for exercising.</td>
<td></td>
<td>1  2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Frequency</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>---</td>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>19.</td>
<td>I received a reward from someone for exercising.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.</td>
<td>I asked someone to remind me to exercise.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21.</td>
<td>I asked someone to assume some of my responsibilities so I could exercise.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22.</td>
<td>I asked someone for advice or demonstration of exercise activities.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23.</td>
<td>I asked an exercise expert/health professional for advice or demonstration of exercise activities.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24.</td>
<td>I rewarded myself for exercising (e.g. snack, watch TV, movies, buy gift, etc.)</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25.</td>
<td>I rewarded myself for reaching health goals related to exercise. (e.g. improved fitness).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>26.</td>
<td>I rewarded myself for reaching appearance goals related to exercise (e.g. lose weight, tone body).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>27.</td>
<td>I punished myself for not exercising (e.g. withhold reward if I don't exercise).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>28.</td>
<td>When I exercised, I focused on how good I felt.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29.</td>
<td>After I exercised, I focused on how good I felt.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>30.</td>
<td>I reminded myself of positive health benefits of exercise (e.g. lose weight, tone body).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>31.</td>
<td>I reminded myself of negative health consequences of not exercising (e.g. heart disease).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>32.</td>
<td>I remind myself of negative appearance consequences of not exercising (e.g. weight gain)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>33.</td>
<td>I mentally schedule time periods to exercise</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>34.</td>
<td>I wrote down specific time periods to exercise</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>35.</td>
<td>I rearranged my schedule of other activities to ensure I had time to exercise.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>36.</td>
<td>If I had conflicts with my scheduled time periods for exercise, I chose exercise.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>37.</td>
<td>I mentally noted barriers which influenced my ability to exercise.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>38.</td>
<td>I mentally planned ways to overcome barriers to my exercise activities</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>39.</td>
<td>I wrote down barriers which influenced my ability to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>40.</td>
<td>I wrote down ways to overcome barriers to my exercise activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>41.</td>
<td>I asked others to identify barriers to my exercise activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>42.</td>
<td>I purposely plan ways to exercise when I am on trips away from home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>43.</td>
<td>I purposely planned ways to exercise during bad weather.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>44.</td>
<td>I place exercise equipment in a prominent place to remind me to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>45.</td>
<td>I place posters or pictures in a prominent place to motivate myself to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>46.</td>
<td>I wrote a note to remind myself to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>47.</td>
<td>I listened to music while I exercised.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>48.</td>
<td>I watched television while I exercised.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>49.</td>
<td>I read while I exercised</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>50.</td>
<td>I used a home exercise facility to help me to exercise regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>51.</td>
<td>I used a local exercise facility/club to help me to exercise regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>52.</td>
<td>On trips away from home, I purposely stay at places which have access to exercise facilities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
# PART 2 - SELF-EFFICACY

| How confident are you that you could exercise under each of the following conditions? |
| 0%| 10%| 20%| 30%| 40%| 50%| 60%| 70%| 80%| 90%| 100% |
| Positively could NOT Exercise | Positively COULD exercise. |

**Confidence Rating 0-100%**

53. I could exercise when I am tired. ______
54. I could exercise during or following a personal crisis. ______
55. I could exercise when feeling depressed. ______
56. I could exercise when feeling anxious. ______
57. I could exercise during bad weather. ______
58. I could exercise when sore from the last work-out. ______
59. I could exercise when on vacation. ______
60. I could exercise when there are ______
61. I could exercise when I have a lot of work to do. ______
62. I could exercise when I don't receive support from my family/ friends. ______
63. I could exercise when I have no one to exercise with. ______
64. I could exercise when my schedule is hectic. ______
65. I could exercise when exercising is not enjoyable. ______
66. I could exercise when I haven't reached my exercise goals ______
Part 3 SOCIAL SUPPORT

Please rate each question twice. Under FAMILY, rate how often anyone living in your household has said or done what is described during the last 4 weeks. Under FRIENDS, rate how often friends, co-workers, or acquaintances have said or done what is described during the last 3 months.

<table>
<thead>
<tr>
<th>None</th>
<th>Rarely</th>
<th>A few times</th>
<th>Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Family</th>
<th>Friend</th>
</tr>
</thead>
<tbody>
<tr>
<td>67.</td>
<td>Exercised with me.</td>
<td></td>
</tr>
<tr>
<td>68.</td>
<td>Gave me encouragement to stick with my exercise program.</td>
<td></td>
</tr>
<tr>
<td>69.</td>
<td>Changed their schedule so we could exercise together.</td>
<td></td>
</tr>
<tr>
<td>70.</td>
<td>Offered to exercise with me.</td>
<td></td>
</tr>
<tr>
<td>71.</td>
<td>Gave me helpful reminders to exercise.</td>
<td></td>
</tr>
<tr>
<td>72.</td>
<td>Planned for exercise on recreational outings.</td>
<td></td>
</tr>
<tr>
<td>73.</td>
<td>Discussed exercise with me.</td>
<td></td>
</tr>
<tr>
<td>74.</td>
<td>Talked about how much they like to exercise</td>
<td></td>
</tr>
<tr>
<td>75.</td>
<td>Helped plan activities around my exercise</td>
<td></td>
</tr>
<tr>
<td>76.</td>
<td>Asked me for ideas on how they can get more exercise.</td>
<td></td>
</tr>
<tr>
<td>77.</td>
<td>Took over chores so I had more time to exercise.</td>
<td></td>
</tr>
<tr>
<td>78.</td>
<td>Made positive comments about my physical appearance.</td>
<td></td>
</tr>
</tbody>
</table>

Part 4 Stage of Change

Please put an X next to the statement that best describes your current exercise status. Choose only one. Note that regular exercise is defined as exercising three times or more per week for at least 20 minutes during each session.

79. ________ I currently DO NOT exercise and I DO NOT intend to start exercising in the next 6 months.

80. ________ I currently DO NOT exercise, but I am thinking about starting in the next 6 months.

81. ________ I currently exercise some, but not regularly (according to the definition given above).

82. ________ I currently exercise regularly, but I started less than 6 months ago.

83. ________ I currently exercise regularly, and have done so for longer than 6 months.
Part 5 - Demographics:

Please complete the following questions about yourself.

84. What gender are you?
   a. female  b. male

85. How old are you? ________ years

86. Which of the following best describes your highest level of education?
   a. some high school  d. college graduate
   b. high school graduate  e. technical/ trade school graduate
   c. some college  f. some graduate school
   g. hold a graduate degree

87. What is your race?
   a. African-American  d. Native American  g. bi-racial
   b. White  e. Hispanic
   c. Asian-American  f. Other

88. What is your marital status?
   a. married currently  d. widowed
   b. divorced  e. single, never married
   c. separated  f. life partner
Part 6 – SEVEN DAY RECALL

During the **LAST 7 DAYS**, how much **TIME** did you spend doing **MODERATE** exercise?

1. In the **DAY** column, mark an “0” for no exercise, “X” each day you engaged in MODERATE exercise.
2. In the **TOTAL MINUTES** column, write in the amount of minutes you did MODERATE exercise that day.
3. In the **ACTIVITY** column, list the MODERATE exercise you did (e.g. walking).

MODERATE EXERCISE: is planned physical activity done to enhance health/fitness which,
1. is continuous for 20 minutes or more
2. mildly elevates heart rate
3. mildly elevates breathing rate
4. can hold a conversation while exercising

Examples:
- low-impact exercise/strength classes
- brisk walking, cycling less than 3 miles,
- recreational team sports (volleyball, soccer, etc.)
- calisthenics (sit-ups, push-ups, etc.)

<table>
<thead>
<tr>
<th>DAY</th>
<th>Minutes</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun:</td>
<td>_____</td>
<td>Golfing without cart, hiking</td>
</tr>
<tr>
<td>Mon:</td>
<td>_____</td>
<td>Half-court basketball</td>
</tr>
<tr>
<td>Tue:</td>
<td>_____</td>
<td>Yoga</td>
</tr>
<tr>
<td>Wed:</td>
<td>_____</td>
<td>Pilates</td>
</tr>
<tr>
<td>Thur:</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td>Fri:</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td>Sat:</td>
<td>_____</td>
<td></td>
</tr>
</tbody>
</table>

During the **LAST 7 DAYS**, how much **TIME** did you spend doing **VIGOROUS** exercise?

1. In the **DAY** column, mark an “0” for no exercise, “X” each day you engaged in VIGOROUS exercise.
2. In the **TOTAL MINUTES** column, write in the amount of minutes you did VIGOROUS exercise that day.
3. In the **ACTIVITY** column, list the VIGOROUS exercise you did (e.g. walking).

VIGOROUS EXERCISE: is planned physical activity done to enhance health/fitness which,
1. is continuous for 20 minutes or more
2. mildly elevates heart rate
3. breathing, rapidly, deeply
4. can NOT hold a conversation while exercising

Examples:
- high-intensity aerobic classes
- competitive full-field sports (soccer)
- competitive full-court basketball

<table>
<thead>
<tr>
<th>DAY</th>
<th>Minutes</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun:</td>
<td>_____</td>
<td>cycling (10 mph more than 3 miles)</td>
</tr>
<tr>
<td>Mon:</td>
<td>_____</td>
<td>swimming laps</td>
</tr>
<tr>
<td>Tue:</td>
<td>_____</td>
<td>running or jogging</td>
</tr>
<tr>
<td>Wed:</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td>Thur:</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td>Fri:</td>
<td>_____</td>
<td></td>
</tr>
<tr>
<td>Sat:</td>
<td>_____</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX H
TAKE CONTROL EVALUATION
Take Control
Home-Based Physical Activity
Program Evaluation

Circle the Number that Best Indicates Your Response. Each lesson was designed to help you adopt or maintain physical activity. Please indicate how useful each lesson was at helping you adopt and maintain physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Lesson 1 – Exercise Preferences: Evaluation of your personal exercise preferences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>2</td>
<td>Lesson 2 – Environmental Changes: Encouraged you to alter your home (physical) environment</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>3</td>
<td>Lesson 2 – Pace of Activity Engaged in activity in which you progressed from a slow walk to a job. Evaluate what pace was comfortable to you</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>4</td>
<td>Lesson 3 – Overcoming Barriers Identifying barriers that prevent you from engaging in physical activity</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>5</td>
<td>Lesson 3 – Plan of Action Once you had identified a barrier, you were to develop a plan of action</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>6</td>
<td>Lesson 4 – Time Management Record daily activities and were to identify times and days were more convenient for fitting physical activity into your schedule</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>7</td>
<td>Lesson 5 – Social Support Exercise Buddy: Ask a family member of friend to exercise with you on a regular basis</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>8</td>
<td>Lesson 5 – Social Support Time Relief: Ask a family member or friend to help you make time to exercise.</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>9</td>
<td>Lesson 5 – Social Support Encouragement: Ask a family member or friend to give you encouragement for you to continue with your exercise program</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>10</td>
<td>Lesson 6 – Long Term Planning Use of Skill in the Future: Recap of skills learn and if you would continue to use those skills</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>11</td>
<td>Lesson 6 – Exercise Plan for Changing Seasons Generate ideas of activities that could be done over the four seasons</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>12</td>
<td>Lesson 6 – Goal Setting for Changing Seasons Set exercise goals that were specific to the four seasons</td>
</tr>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>
Throughout the program a variety of techniques were used to help you with your physical activity program.

Please indicate the usefulness of each item:

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Not Useful</th>
<th>Somewhat Useful</th>
<th>Useful</th>
<th>Very Useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Setting weekly goals for activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. Keeping track of daily physical activity (activity log)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. Keeping track of daily step with pedometer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. Receiving old lessons back with feedback</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please indicate your opinion of the aspects of the program:

<table>
<thead>
<tr>
<th>Aspect Description</th>
<th>Strongly Disliked</th>
<th>Disliked</th>
<th>Liked</th>
<th>Strongly Liked</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Accessibility to Staff</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. Flexibility of Staff</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. Friendliness of Staff</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. Flexibility of Program (Were given more time to work on a lesson if you needed it)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. Ease of Use of Program (Pick Up and Drop Off Routine)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. Pick Up and Drop Off Schedule Provided Adequate Time to Complete Each Lesson</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23. Instructions to lesson were understandable (You understood the instructions and knew what to do)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24. Keychain Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25. Pedometer Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>26. Jump Rope/Hand Weight Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>27. Cash Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>28. Packet: Introductory Section</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29. Packet: Educational Section</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29a Types of Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29b Recommendations of Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29c Weight Management</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29d Injury Prevention</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>30. Packet: Community Resources</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Please indicate any aspect of the program that you liked or found to be useful

Please indicate any aspect of the program that you did not like or did not find useful

What aspects of the program would you recommend to be changed? How would you change them?
What could we do to make this program better?

What did you like the most about the program?

What did you like the least about the program?

Congratulations on completing the TAKE CONTROL PROGRAM.
In about 4 weeks a Neighborhoods on the Move staff will be contacting you to conduct a follow-up survey.

We appreciate your participation in the program. We hope it helped in your strive to become more active.

Neighborhoods on the Move is continuously offering new programs. If you would like to find out more about Neighborhoods on the Move please call 614-688-8648

Or email neighborhoodsonthemove@hotmail.com
Or webpage: http://www.education.osu.edu/paes/nom/
APPENDIX I
JUST MOVE EVALUATION
TAKE CONTROL HOME-BASED PROGRAM
AMERICAN HEART ASSOCIATION’S
JUST MOVE

Throughout the program a variety of techniques were used to help you with your physical activity program. Please indicate the usefulness of each item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not Useful</th>
<th>Somewhat Useful</th>
<th>Useful</th>
<th>Very Useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Setting weekly goals for activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Keeping track of daily physical activity (activity log)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Keeping track of daily step with pedometer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Just Move – American Heart Association brochure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Exercise and Your Heart – American Heart Association Brochure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please indicate your opinion of the aspects of the program.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Strongly Disliked</th>
<th>Disliked</th>
<th>Liked</th>
<th>Strongly Liked</th>
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<tbody>
<tr>
<td>6. Accessibility to Staff</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Flexibility of Staff</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Friendliness of Staff</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Ease of Use of Program (Pick Up and Drop Off Routine)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Keychain Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. Pedometer Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tr>
<tr>
<td>12. Jump Rope/Hand Weight Incentive</td>
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<td>2</td>
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<td>4</td>
</tr>
<tr>
<td>13. Cash Incentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. Packet: Introductory Section</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Packet: Educational Section</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. Types of Fitness</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>16. Recommendations of Fitness</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<tr>
<td>17. Weight Management</td>
<td>1</td>
<td>2</td>
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<tr>
<td>18. Injury Prevention</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>19. Packet: Community Resources</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Please indicate any aspect of the program that you liked or found to be useful

Please indicate any aspect of the program that you did not like or did not find useful

What aspects of the program would you recommend to be changed?  
How would you change them?  
What could we do to make this program better?

What did you like the most about the program?

What did you like the least about the program?

Congratulations on completing the Just Move Program.

In about 4 weeks a Neighborhoods on the Move staff will be contacting you to conduct a follow-up survey.

We appreciate your participation in the program. We hope it helped in your strive to become more active.

Neighborhoods on the Move is continuously offering new programs. If you would like to find out more about Neighborhoods on the Move please call 614-688-8648
Email neighborhoodsonthemove@hotmail.com
Webpage: http://www.education.osu.edu/paes/nom/