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A NATURALISTIC STUDY OF EXERCISE ADHERENCE AMONG A
COMMUNITY BASED SAMPLE AT A FITNESS FACILITY

by

Felicia M. Johnson

A DISSERTATION

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A NATURALISTIC STUDY OF EXERCISE ADHERENCE AMONG A
COMMUNITY BASED SAMPLE AT A FITNESS FACILITY

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University of Nebraska, 2010

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This study aimed at investigating the factors predictive of exercise for short-term (i.e., at least six months) and long-term (i.e., at least one year) adherence at a fitness facility. Exercise adherence, defined through the Transtheoretical Model (TTM) as the *maintenance* stage of change, and frequency of participation in exercise were measured through member utilization of the fitness facility as it occurred in the participant's natural setting without interference of the researcher. Each time a member entered the exercise facility they scanned their member card and their attendance was automatically recorded into the membership computer system. Fitness Planning & Positive Appraisal, Social Support, Weight and Diet, and Stress Management were the factors studied to predict exercise adherence. The factors were measured using the ProActive Wellness Assessment (PWA), a 60-item self-report measure designed to understand a respondent's satisfaction with self-efficacious factors that implement and aid in maintaining healthy behavior change. The results of a linear regression analysis revealed that Fitness Planning & Positive Appraisal, a measure of a person's enjoyment of exercise, exercise on a regular basis through planning, and feelings of achievement, significantly predicted the

frequency of exercise for both short- and long-term exercise adherence ($\beta = .30, p < .001$). Further, the overall R^2 value for the model was .09. The results of this study suggest that positive appraisal and planning are important factors in the maintenance of physical activity. Further, it appears that the constructs of greatest interest, those related to positive appraisal of one's attitude towards exercise and their ability to make a plan are the most salient for predicting behavior change outcomes through successful initiation and maintenance of exercise.

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CHAPTER 1

INTRODUCTION

The purpose of this study was to identify behavioral factors that contribute to frequency of participation in exercise among people with short-term (i.e., at least six months) and long-term (i.e., at least one year) exercise adherence at a fitness facility. In this study, *frequency of participation in exercise* is defined as the number of days a person has attended his/her exercise facility divided by the number of days he/she has been a member of the facility (i.e., Utilization Ratio). In this study, *adherence* is defined as gym membership for at least six months, also explained through the Transtheoretical Model as the *maintenance* stage of change (TTM, Prochaska & DiClemente, 1983).

This study is important because research has not yet been able to clearly identify or agree upon the factors predictive of exercise adherence and will examine behavioral determinants within the stages of the TTM. Individuals typically move through various stages of exercise participation that can be determined by diverse factors (Sherwood & Jeffery, 2000). These stages can be explained through the Transtheoretical Model of Change (Prochaska & DiClemente, 1983).

Research has identified that differences exist in the factors that predict adoption/initiation of exercise and the factors that predict adherence (Dishman, 1994; Sallis & Owen, 1999). Although a great deal of research has focused on increasing adoption/initiation of exercise, a limited amount has focused on increasing successful adherence to exercise. It has become important to identify the determinants that contribute to the adherence of exercise in order to aid in the maintenance required to

receive the health benefits of physical activity. This knowledge can assist in the design of prevention programs to help people live in healthier ways. In order to determine the factors that contribute to the adherence of exercise, the current study has looked to the physical activity and exercise research. Although there is a major consensus that the factors predictive of physical activity are diverse, several behavioral determinants have frequently emerged through research and have been continuously highlighted. These determinants include: (a) fitness planning and positive appraisal (e.g., DuCharme & Brawley, 1995; Milne, Orbell, & Sheeran, 2002; Norman & Conner, 2005; Sallis & Hovell, 1990; Sniehotta, et al. 2005); (b) social support (e.g., Carron, Hausenblas & Mack, 1996; Dacey, Baltzell, & Zaichkowsky, 2003; Oka, King, & Young, 1995); (c) weight and diet (e.g., Boreham, Wallace & Nevill, 2000; Ekkekakis & Lind, 2006; Schmitz, French & Jeffery, 1997; and (d) stress management (e.g., Allison, Adlaf, Ialomiteanu & Rehm, 1999; Stetson, Rahn, Dubbert, Wilner, Mercury, 1997).

The current study aims to examine the behavioral determinants listed above as predictors (independent variables) of frequency of participation in exercise (dependent variable) among those with adherence at a fitness facility. The literature suggests that these variables influence physical activity and changing these mediating variables should produce changes in the behavior (Sallis & Owen, 1999). Research findings that specify behavioral indicators of exercise adherence have the most application in designing interventions. Behavioral indicators provide direction in how to develop new behavioral routines that would promote exercise adherence (Leith & Taylor, 1992). “Programs that utilize principles of behavior modification, including goal setting, self-monitoring, and

social support rather than simple educational programs are more effective and have better long-term adherence rates” (Dishman & Buckworth, 1996, pg. 716). By examining these determinants, a clearer understanding of the diversity and complexity that has been used to explain exercise behavior will be gained.

Participation in regular exercise contributes positively to physical and psychological health (Perri et al., 2002). With the increasing levels of obesity and inactivity in adults and adolescents in the United States, the need toward increasing physical health has become apparent. Furthermore, it is well established that physical activity is an effective way to reduce the risk of chronic and acute diseases such as heart disease, colon cancer, diabetes, and falls/fractures (Sallis & Owen, 1999; U.S. Department of Health and Human Services [USDHHS], 1996). In order to reach maximal health benefits, one must engage in proper amounts of regular physical activity (American College of Sports Medicine [ACSM], 1998; USDHHS, 1990). The guidelines set by the ACSM describe the frequency, duration, and intensity of exercise needed to develop and maintain cardiovascular fitness and reduce body fat. The guidelines, not specific to various disabilities, recommend a minimum of at least three 20-60 minute exercise sessions per week.

Although proper amounts of regular physical activity are associated with reduced health care costs, reduction in disease states, and improved quality of life (USDHHS, 1996), most of the American population fails to engage in enough exercise to receive long-term health benefits (Dishman, 1994; USDHHS, 1996). Sedentary behaviors and less than recommended amounts of physical activity can lead to chronic disease and

premature mortality (Mokdad, Marks, Stroup, & Gerberding, 2004). While an exercise program will only improve health and alleviate health risks if it is followed consistently, only an estimated 11% of healthy adults engage in moderate-to-vigorous exercise three or more days per week. Casual adherence has not been shown to be sufficient in making beneficial changes in health (Bock, Marcus, Bernardine, Pinto & Forsyth, 2001; Bravo et al., 1997).

In spite of the push for improved fitness and health from health care providers, the majority of the population fails to adhere to exercise. Attrition and drop-out also continues to be a problem among those who have begun an exercise program (Buckworth & Nigg, 2004). When an exercise regimen is initiated, 50% drop out within six months (Dishman, 2001; Sallis, Hovell, & Hofstetter, 1992). Along these lines, about 50% to 60% of individuals who join fitness clubs drop out within six months or do not renew their membership (Marcus & Forsythe, 2003). These important findings lead to the question of how to develop interventions that aid in successful adherence after the initiation of exercise. What constitutes successful adherence remains undefined. This is due in part to the inconsistent use of the term “adherence” in exercise research.

Adherence has been used to describe exercise participation without consistent temporal units or amounts of activity. Therefore, it has become important to determine what factors are most predictive of exercise maintenance using a consistent definition of adherence if effective interventions can be implemented and exercise regimens are to have their optimal effects. One theoretical model incorporates the distinguishing features

necessary to clearly define adherence. The aforementioned Transtheoretical Model's *stages of change* offers a consistent way to study adherence.

The Transtheoretical Model (TTM) (Prochaska & DiClemente, 1983) and its application to a wide range of health behaviors, including physical activity, have received considerable attention. The Transtheoretical Model is an integrative model for understanding how people progress toward adopting and maintaining health behavior change and has been extensively used in the literature (Marcus & Simkin, 1994). Core features of the model include the five stages of change, processes of change and self-efficacy. The stages of change address five levels of readiness toward making a change in behavior such as adopting an exercise routine (Prochaska, & DiClemente, 1983). They are:

- 1) *Precontemplation*: an individual has no intention to take action within the next six months.
- 2) *Contemplation*: an individual intends to take action within the next six months.
- 3) *Preparation*: an individual intends to take action within the next 30 days and has taken some behavioral steps in this direction.
- 4) *Action*: an individual has changed overt behavior and participated in the new behavior regularly for less than six months.
- 5) *Maintenance*: an individual has changed the overt behavior and participated in the new behavior regularly for more than six months.

The TTM accepts that six months is an appropriate timeframe for behavior change to become imbedded (Prochaska & DiClemente, 1983). It is most commonly accepted that an individual reaches maintenance after engaging in regular physical activity for a minimum of six months with or without an intervention (Dunn, Marcus & Kampert, 1999). Therefore, the current study accepts this timeframe as relevant to adherence of

exercise and examines behavioral determinants of adherence within the stages of the Transtheoretical Model.

The behavioral determinants examined in the current study are: (a) fitness planning and positive appraisal; (b) social support; (c) weight and diet; and (d) stress management. These determinants have been proven to be strong contributors of physical activity, and are examined in the current study as behavioral determinants to exercise adherence. The first variable, fitness planning and positive appraisal, represents one's degree of physical activity enjoyment, exercise goals, and the perceived ability to achieve these goals. Those who value exercise as an enjoyable activity are more likely to prioritize and plan or schedule exercise into their daily lives. As a fitness plan becomes established, the behavior becomes more habitual, and adherence is more likely to occur (Maddux, 1993). The second variable, social support, represents the degree to which an individual perceives that others encourage him/her to engage in wellness activities. Individuals receiving more support from persons in their home or work environments are shown to participate in more regular exercise (Hovell et al., 1991). Social support is viewed as a behavioral determinant in that a person with lower levels of perceived support may not be effectively reaching out to friends, family, or health professionals. The third variable, weight and diet, represents an individual's level of happiness with current weight, fitness, and eating habits. Physically active individuals tend to maintain a healthier diet and weight than sedentary individuals (Sherwood & Jeffery, 2000). A hypothesis this study is based on is that a person who is more satisfied with their dietary habits and weight will be more likely to adhere to exercise. The final variable, stress

management, is represented in this study as how well a person feels he/she can manage stress/emotions. Perceived stress has been shown to have the strongest impact on exercise behavior (Stetson, Rahn, Dubbert, Wilner & Mercury, 1997). High levels of stress have also been shown to negatively influence physical activity and health behavior patterns (Allison, Adlaf, Ialomiteanu & Rehm, 1999). Therefore, one's perceived ability to manage stress is examined as a contributor to exercise adherence. Further support for the inclusion of these variables will be presented in the following chapter.

Rationale for the Study

This study is important and needed for several reasons. In order to improve the applicability and quality of research associated with exercise adherence and increase the number of people who remain active participants in exercise, several major limitations in the adherence research must be addressed and modified. First, the available literature has used conflicting definitions of adherence for healthy adults. Adherence can be defined in terms of frequency, duration, and/or intensity of exercise. Many variations of these terms have been used in the literature. Time frames, when considered, have also been used inconsistently to measure adherence (e.g., Izquierdo-Porrera, Powell, Reiner & Fontaine, 2002; Perri et. al, 2002; Wilcox & King, 2004). Anything less than six months of regular exercise is not enough to receive major health benefits from the physical activity (Bock et al., 2001). It has been suggested that a standard definition of adherence would enhance the interpretability and application of future research in this area (White, Ransdell, Vener & Flohr, 2005).

Additionally, the variables used to research and predict adherence are inconsistent. Many models and theories exist to explain and understand physical activity/exercise behavior providing differing predictors of exercise (e.g., Azjen, 1985; Bandura, 1986; Deci & Ryan, 1985 Prochaska & DiClemente, 1983). Researchers have not come to a consensus on which factors should be studied, thus, their findings from these studies do not provide definitive findings to individuals or professionals.

The current study addresses these shortcomings found in the exercise adherence research by providing a more consistent definition of adherence using the TTM stages of change, and focusing on the behavioral determinants of adherence that aid in the formation of specific behavioral interventions as necessary for those in the later stages of exercise change. Behavioral determinants will be studied within the stages of the TTM.

The measurements of exercise adherence and frequency of participation in exercise in a naturalistic setting without the use of self-report also adds to the importance of this study. Adherence, in this study, is measured through member utilization of the fitness facility as it occurs in the participant's natural setting without interference by the researcher. The subject is not asked to recall or track their physical activity. The behavior is not influenced by the data gathering process because unobtrusive measures that are not visible are used (a computer system is used to scan a member's ID at check-in to measure attendance). The majority of studies on physical activity have used self-report measures, which are prone to memory biases (Leenders, Sherman & Nagaraja, & Kien, 2001). One example includes a study by Kirchhoff, Elliot, Schliching & Chin (2008) in which participants were asked over the telephone if they were currently engaged in a minimum

level of exercise necessary for adherence specified by the researchers, or had done so in the past. Those whose responses met the requirement (in the present or past) were then asked to describe weekly activities, time spent participating in these activities, and how many months/years they were active. This is problematic because the use of single-response self-report measures may foster responses that focus on earlier episodes of exercise or recent physical activity rather than providing a more complete overview of physical activity over the course of a given time frame. They also run the possibility of inaccurate recall about details of past participation (Baranowski, 1985; Montoye, Kemper, Saris, & Washburn, 1996). Subjects may also overestimate frequency (Matt, Garcia, Primicias, Frericks, DeFaria 1999). This study extends prior research by using a more objective measure of adherence.

Statement of Problem

Although the links between regular exercise and health are well documented, many people remain sedentary. Those who do become active may exercise too infrequently or drop out before receiving health benefits offered through regular exercise. The determinants of physical activity at the initiation of exercise are shown to differ from those at maintenance. Research has not yet been able to clearly identify the predictive factors of exercise adherence that can be targeted for changes. A major practical concern in health promotion is how to facilitate the maintenance of regular exercise and fitness center utilization. An understanding and knowledge of the behavioral factors influencing adherence will help in the design of more practical and effective health promotion and

counseling interventions and accomplish the task of increasing regular exercise and fitness center utilization (Ameritage & Arden, 2002).

Research Questions

Research Question One: How do the factors of (a) Fitness Planning & Positive Appraisal; (b) Social Support; (c) Weight and Diet; and (d) Stress Management predict frequency of participation in exercise (i.e., Utilization Ratio) among people with short-term adherence (at least six months) to exercise at a fitness facility?

Research Question Two: How do these four same factors predict frequency of participation in exercise (i.e., Utilization Ratio) among people with long-term adherence (at least one year) to exercise at a fitness facility?

Research Question Three: How does the predictive equation for Research Question One vary when considering gender and age?

CHAPER 2

LITERATURE REVIEW

Despite the many known benefits of exercise, most individuals remain physically inactive, and for those who initiate an exercise program, most do not maintain the exercise long enough to receive health benefits. Within the general U.S. population, nearly half of those who initiate exercise are unable to stick with their program or regimen for at least six months (Dishman, 1994; McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003). Consequently, recognition has been given to the notion that the determinants of adoption and maintenance of exercise differ. The diverse determinants of physical activity and exercise cannot be generalized to both the adoption/initiation of exercise and the adherence to exercise (Dishman, 1994). The adherence of exercise is a separate entity in the physical activity research and the determinants of exercise adherence necessitate further study. Although the conceptual understanding of exercise adherence is continuously refined, researchers have not been able to convert these findings into clearly measurable or applicable guidelines.

The purpose of this chapter is to evaluate and review the physical activity and exercise literature focusing on the major behavioral factors related to regular participation and adherence. The chapter is divided in two sections: (1) Evaluation of physical activity and exercise adherence research, and (2) Review of the behavioral factors related to adherence.

The first section serves two major purposes. The first purpose is to present several major limitations found in the exercise adherence research including the inconsistencies

in the definition of adherence as well as the factors studied to predict adherence. The second purpose is to present a theoretical model of change that serves as a basis to understanding and defining adherence.

The second section also serves two major purposes. The first purpose is to provide support, through the research, for the inclusion of the behavioral factors used in this study to predict adherence. These factors include (a) fitness planning and positive appraisal; (b) social support; (c) weight and diet; and (d) stress management. The second purpose is to examine the influence of age and gender on adherence research. This review is necessary to determine which factors contribute specifically to adherence and enhance the interpretability and application of future research in this area.

Physical Activity and Exercise Adherence

Physical activity research has not always differentiated between *physical activity* and *exercise* (Speck & Harrell, 2003). Early research has been vague in its definition of physical activity and has regarded all types of physical activity as exercise. This vagueness caused a great deal of confusion in the interpretation and application of physical activity research. More recently, a clear definition has been agreed upon. Physical activity can be defined as any bodily movement produced by skeletal muscles that require energy to produce (Caspersen, Powell, & Christenson, 1985; Sallis & Owen, 1999). Physical activity can be further classified according to the context in which it is performed. Exercise depicts a type of physical activity, or bodily movement, which is repetitive, planned, structured and performed to improve or maintain one or more

components of physical fitness (Caspersen, et al. 1985; USDHHS, 1996; Sallis & Owen, 1999).

Several leading health and fitness organizations have developed recommendations and have reached a consensus for the proper levels of exercise necessary to receive health benefits. Research has determined that frequent engagement in physical activity/exercise can drastically lower obesity and mortality risk (Haskell, 1994). The American College of Sports Medicine (ACSM), a national organization of health promotion, and the American Heart Association have set guidelines for exercise needed to attain minimal levels of physical fitness. A minimal exercise program should consist of at least three 20-60 minute exercise sessions per week. These guidelines for regular exercise have been reported by the ACSM as the necessary amount of exercise needed to receive the health benefits of exercise. Although a clear definition of physical activity and exercise has been agreed upon, a definition of exercise adherence remains ambiguous and inconsistent. The following section will present several limitations in adherence research, including its definition.

Limitations & Inconsistencies in Adherence Research

Most recent discussions of physical activity and exercise have begun to acknowledge the complexity in understanding exercise adherence (Sherwood & Jeffery, 2000). This complexity is due in part to an inconsistent definition of adherence as well as an inconsistency in the factors studied to predict adherence. This brings forth methodological concerns because a consensus regarding a conceptual definition of exercise adherence has not been reached (Leith & Taylor, 1992). Without a clear,

common definition for adherence, it is difficult to find consistency in the determinants used to measure adherence.

The physical activity and exercise research that have defined adherence show multiple definitions and a variety of techniques used in measurement. Several examples demonstrating this inconsistency include adherence defined as: percentage of sessions completed relative to the number of sessions prescribed (Brassington, Atienza, Perczek, DiLorenzo & King, 2002; Cox, Burke, Gorely, Beilin, & Puddey, 2003; Marcus & Stanton, 1993; Wilcox & King, 2004); number of weeks participants exercised three times or more (Hallam & Petosa, 2004); number of days and duration of time spent participating in physical activity (Jakicic, Wing, Butler, & Robertson, 1995); number of exercise sessions reported (King, Haskell, Young, Oka, Stefanick, 1995); total exercise sessions attended (McAuley, Jerome, Marquez, Elavsky & Blissmer, 2003); total minutes of walking (Perri et al., 2002); the number of sessions attended out of the total possible sessions (Izquierdo-Porrera, Powell, Reiner & Fontaine, 2003; Ransdell, Dratt, Kennedy, O'Neill, & DeVoe, 2001) or the average of 20 minutes or more, at least three days per week for 6 months (Morey et al., 2003). Buckworth & Nigg (2004) found that the frequency, intensity and duration of exercise are not often reported in adherence research.

There has been increased recognition that the determinants of physical activity at initiation and maintenance differ (Lippke & Ziegelmann, 2006). Therefore, including a timeframe between the initiation and maintenance of adherence seems necessary. Much of the early research examining determinants of physical activity and exercise

participation did not acknowledge this distinction and those who adopted and initiated exercise for one week were not differentiated from those who adhered to regular exercise for one year. It has been suggested that the time frame for adherence should be six months (Bock, Marcus, Pinto & Forsyth, 2001; Dishman, 1994) and is equivalent to the maintenance stage of the Transtheoretical Model (TTM; Prochaska & DiClemente, 1983). Moreover, not all research that has identified this temporal distinction provides a clear, common definition of adherence. Even the most current research has used inconsistent time frames and factors in evaluating adherence.

This study offers a theoretically based definition of adherence examining exercise determinants in a community-based sample of men and women at a fitness facility. The theory has been useful in studies of physical activity and exercise research that acknowledges the distinguishing element of temporal units in relation to an individual's stage of change (for example, a person in the maintenance stage of change has participated regularly in exercise for at least six months). The Transtheoretical Model of Behavioral Change (TTM) (Prochaska, & DiClemente, 1983) is a behavioral science model that is used to explain the process of change that occurs when an individual changes an unhealthy habitual behavior then initiates and finally maintains the healthy behavior. Many studies have applied this model to differentiate between the stages of exercise and explain the process of engaging in regular physical activity or exercise (Marcus & Simkin, 1994). The current study uses the TTM to provide a reliable theoretical basis in defining and measuring the dependent variable of adherence. Overall, the TTM was chosen for this study because it provides the construct (stages of change)

necessary to advance and generalize adherence research. The TTM will be discussed further in the following section.

Finally, the major factors that are examined by researchers to understand or predict adherence are inconsistent. With a plethora of theories and models used to explain physical activity and exercise behavior, studies of adherence consider diverse factors, and a consensus on the major determinants is difficult to decipher. Research on exercise adherence has used constructs from many different theories including the Self-Determination Theory (Deci & Ryan, 1985); the Social Cognitive Theory (Bandura, 1986); the Social Learning Theory (Mischel, 1973); the Theory of Planned Behavior (Ajzen, 1985); as well as the Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1983). The constructs that make up each theory consist of cognitive, environmental, social, and behavioral factors across behavior change. Although these preferred models have different underlying philosophies, many of their major constructs overlap. For example, social support is a construct that provides a theoretical basis for social cognitive theory, social learning theory, theory of planned behavior, and the transtheoretical model of behavior change. Several theories such as the social cognitive theory (Bandura, 1998) and the theory of planned behavior (Ajzen, 1991) consider intention, a cognitive construct, as the most important determinant of behavior. However, the strength of the relationship between intention and behavior is only modest (Ameritage & Conner, 2001; Sheeran, 2002). Modest relationships between theoretical constructs and actual behavior have forced researchers to investigate additional factors that can close the gap (Abraham, Sheeran, Conner, de Vries, & Otten, 1999; Bagozzi,

1992). In the case of intention-behavior gap, determinants such as planning (Gollwitzer, 1999) and goal-setting (Locke & Latham, 1990) have been found to increase the probability of actual performance of exercise. With a goal of maintenance in mind, examining the major factors that control behavior will contribute to the applicability and usefulness of adherence research. Health professionals may then begin to use this research to develop specific behavioral interventions that modify the factors that control behavior.

Transtheoretical Model of Change

One of the most effective and widely used change models for healthy behavior is the Transtheoretical Model of Behavior Change (e.g., DiClemente & Prochaska, 1982; Prochaska, DiClemente & Norcross, 1992; Prochaska, Velicer, Rossi, Goldstein, & Marcus, 1994; Velicer, Prochaska, & Redding, 2006). The TTM was originally developed to categorize behavior change in a variety of areas (e.g., DiClement & Prochaska, 1982; Prochaska & DiClemente, 1983; Prochaska, DiClemente & Norcross, 1992; Prochaska, Johnson, & Lee, 1998), but more recently with respect to exercise (e.g., Marcus, Rossi, Selby, Niaura, & Abrams, 1992). The TTM identifies a series of stages an individual may undergo in their efforts to change behavior based on their readiness for exercise.

Stages of Change

The stages of change are the main component of the TTM (Table 1), and are characterized by an integration of the actual behaviors, the degree of readiness to change and a time dimension. Through the use of this model, interventions to change unhealthy

behaviors can be tailored to each stage. Recent empirical evidence has emerged in favor of the TTM, suggesting that the concept of the stages of behavior change is significant and has practical value (Lippke, Nigg & Maddux, 2007; Lippke & Plotnikoff, 2006, Velicer, Prochaska, & Redding, 2006; Velicer, Redding, Sun & Prochaska, 2007). In the first stage, *precontemplation*, an individual has no intention to take action in changing the problematic behavior within the next six months. At this stage, a person may not have a desire to change the problematic behavior, or think they are capable of changing the behavior. The long-term consequences or ramifications of the problematic behavior are rarely acknowledged or considered with much attention. An individual has a negative attitude regarding physical activity or exercise in this stage. Following the precontemplation stage is *contemplation*. In this stage, individuals do have the intention to change their behavior within six months, but it is not done immediately due to the perceived effort involved in changing the unhealthy behavior. There appears to be some recognition of the benefits of change, but the benefits are not perceived to outweigh the disadvantages. An individual moves into the *preparation* stage once there is intent to take action within the next 30 days and some behavioral steps have been made toward the progression of adopting the healthy behavior. An individual in this stage is in the process of changing their unhealthy behavior, but the change is not occurring at a productive level. In this stage an individual may talk to a physician, gather information about joining an exercise program or gym or may actually begin exercise at a gym. Positive results are not typically seen in this early stage due to the relatively new adoption of the behavior at levels that are not productive enough to yield results that exhibit health benefits (Guillot,

Kilpatrick, Hebert, & Hollander, 2004). In the *action* stage, individuals have made a desired behavior change for less than six months. Although an individual in this stage has made a behavior change for only a short period of time, active participation and a significant effort is made toward the new behavior at a productive level (Guillot et al., 2004). The action stage is most characteristic of regression and suspension as problems are encountered. The final stage of change is *maintenance*, in which the behavior has been changed at a productive level for more than six months. The benefits of the behavior change can be seen in this stage and the new behavior requires increasingly less effort to maintain. Due to the habitual nature of the behavior in this stage, an individual is more confident in their ability to maintain the behavior. There is increased conviction that the healthy behavior can be maintained. Regression is not as frequent in this stage because an individual who has reached maintenance has learned to overcome many of the problems that first arose in the action stage.

As previously stated, adherence has been equated with the maintenance stage (Bock et al., 2001; Dishman, 1994). The basis for the definition of adherence used in this study comes from the characteristics of the maintenance stage. Therefore, exercise adherence has been defined in this study as participation in exercise for at least six months. Participation is necessary for the exercise to be productive and beneficial to one's health. Casual adherence is insufficient to produce beneficial changes in health (Bravo Gauthier, Roy, Payette, & Gaulin, 1997). The national guidelines for exercise set by organizations such as the ACSM have provided recommendations for productive levels of exercise

(ACSM, 1998). The remainder of the chapter will address the factors related to or predictive of adherence.

Behavioral Factors Related to Adherence

Research on the determinants of physical activity identifies those factors associated with, or predictive of, this behavior. As previously discussed, there has been much inconsistency in the factors studied to predict adherence. There is not one generally accepted theory that provides an optimal set of factors to predict adherence. Many studies have combined multiple theories to explain or predict adherence (e.g., Schwarzer, 2008) or have added constructs to an existing theory (e.g., Lippke & Ziegelmann, 2006) in order to fill in any missing gaps. Without a consensus about the major variables to be studied (Speck & Harrell, 2003), it becomes difficult to develop prevention programming. Although the research on the study of exercise adherence suggests a variety of factors are responsible for determining whether or not an individual stays in an exercise program, many of the findings provide little information of practical significance to the mental health or exercise professional (Leith & Taylor, 1992). Therefore, the factors related to exercise adherence that are most frequently mentioned in the physical activity, health and psychological literature are employed in the current study beginning with modifiable factors that are most relevant to people in the maintenance stages of change, followed by factors that cannot be changed, such as gender and age. These modifiable factors include (a) fitness planning and positive appraisal; (b) social encouragement; (c) body weight and diet; and (c) stress management.

Fitness Planning & Positive Appraisal

Many people intend to be active or exercise, but fail to act on their intentions and remain sedentary. Individuals who do not act on their intentions may lack the self-regulatory skills required to engage in the behaviors needed to form exercise habits (MacKeen, Franklin, & Nicholas, 1983). Planning refers to a self-regulatory strategy in which a behavioral response is linked to specific situations to achieve a specific goal (Sniehotta et al., 2005); implantation of an action is planned in advance. In addition to forming a plan, forming an active mental representation of the target situation allows for a more appropriate, successful behavioral response. Action planning has been successfully applied to diverse health-related behaviors such as maintaining a healthy diet, regulating the consumption of alcohol, and engaging in physical activity (Milne, Orbell, & Sheeran, 2002). Research suggests that interventions implementing goal setting, planning, self-monitoring, and self-reward skills can increase participation among people who do intend to exercise (Sallis & Hovell, 1990). Azjen (1985) theorized that the more favorable one's attitude toward a behavior (the degree to which one has a favorable or unfavorable evaluation or appraisal of the behavior), the stronger an individual's intention to perform the behavior.

Norman & Conner (2005) examined the role of fitness planning and intention on exercise behavior in a sample of college students. The researchers identified intention as a cognitive response that did not always transform into a behavioral response. Fitness planning went much further than intention formation by considering specific situations

for exercise and eliciting automatic response behavior. Fitness planning suggests that people are less likely to forget their intentions when they have been specifically set out.

The effects of long term fitness planning and the use of a diary on exercise were examined in coronary rehabilitation patients (Sniehotta et al., 2005). Both planning and diary logs proved to be useful in increasing exercise and adherence in these patients. The researchers found that planning was not only useful in changing intentions to behaviors but also in coping with difficulties or common setbacks.

The most frequent reason given for not exercising is a lack of time (DuCharme & Brawley, 1995; Young, 2005). It has been suggested that as people develop a pattern of adherence to exercise, decisions about exercise become less deliberate and behaviors become more habitual (Maddux, 1993). These decisions may include whether or not to exercise, how much to exercise, or at what level to exercise. However, even among individual who adhere to regular exercise, scheduling efficacy remains an important predictor (DuCharme & Brawley, 1995). Scheduling, similar to planning, refers to deliberate decision-making that requires an individual to plan exercise into their daily/weekly schedule. Therefore, DuCharme and Brawley (1995) recommended that regular exercisers become proficient and skillful in scheduling and dealing with time as a barrier to maintain long-term adherence. Although time is not a single independent predictor used in the current study, it is evaluated through fitness planning. If a person is able to make a fitness plan and follow through with the plan, exercise has been made a priority.

Feelings of well-being brought on by exercise and feelings of enjoyment for exercise seem most important to maintaining physical activity (Dishman, 1982). Positive feelings from exercise have been found to be more important than the beliefs about health benefits received from exercise among active exercisers (Sallis & Hovell, 1990). Similarly, Hausenblas, Corran and Mack (1997) found that those who are able to maintain their commitment to exercise hold favorable beliefs about exercise and believe they can successfully perform the behavior. Those who believe and value exercise as an enjoyable activity have been found to adhere to exercise through the prioritization and follow through of the planned behavior (Young, 2005). A positive relationship exists between fitness planning and enjoyment of exercise (Boyd & Yin, 1999). Young (2005) suggested cognitive restructuring for improving one's perception of exercise. Cognitive restructuring consisted of replacing one line of thinking with another. Instead of "I have too much work to do at work today, I'll exercise later," replace it with, "If I exercise now, I'll accomplish more at work later because I'll have more energy and think more clearly." Good intentions and the positive appraisals of exercise are more likely to be translated to actual exercise and adherence when a plan has emerged to implement the intention to exercise (Gollwitzer, 1999). The relationship between fitness planning and positive appraisal increases the likelihood that it becomes a priority and a maintained daily activity, which has been shown to predict adherence to exercise (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Mullan, Markland, & Ingledew, 1997; Ingledew, Markland & Medley, 1998).

Furthermore, although only a few studies have investigated the effects of planning one age, it has been found to be effective for older individuals. Chasteen, Park, and Schwarz (2001) studied the effects of planning on task performance in a group of older adults. Although older individuals may experience a decline in prospective memory, the researchers concluded that older individuals benefit from planning by demonstrating that they were twice as likely as the control group to successfully perform a laboratory task. The automatic process of behavior was independent of the individual's prospective memory capabilities. The effect of planning on exercise behavior has not been investigated with older adults.

Social Support

Social support is referred to as the encouragement and/or assistance that an individual receives from his/her family and friends (Oka, King, & Young, 1995). Social support is another strong correlate of physical activity (e.g. Marcus, Dubbert, Forsyth, 2000; Okonski, 2003) that is formed by the people who supply emotional support, companionship, help, and advice (Sallis & Owen, 1999). An individual's source of social support appears to affect their probability of adhering to physical activity. Individuals who engage in regular exercise report more support for activity from people in their home and work environments, which include family and friends (Hovell et. al., 1991). Courneya and McAuley (1995) suggested that social support from family and friends might enhance perceived behavioral control over regular participation in exercise.

Carron, Hausenblaus & Mack (1996) examined six major sources of social influence on physical activity, including such important others as physicians or work

colleagues, family members, exercise instructors, and members of exercise groups. They concluded that the social influence generally has a small-to-moderate effect. Effects that were moderate to large were found for family support and attitudes about exercise, task cohesion, important others and attitudes about exercise, and family support and compliance behavior. Oka, King, & Young (1995) examined the types of social support that were predictive of exercise adherence in men and women over a yearlong exercise program. Social support specific to exercise was found to be a better predictor of exercise adherence than was general social support. The authors acknowledged that the relationship between physical activity and social support is a dynamic process in which sources of support need further study.

Social support experienced through bonding, setting and reaching goals with another person or as a group, also increases adherence to physical activity (Ransdell, Dratt, Kennedy, O'Neill, & DeVoe, 2001; Okonski, 2003; Spink & Carron, 1992; Wallace, Raglin, & Jastremski, 1995). When mothers and daughters participate in physical activity together, they appear to enjoy the activity as an opportunity to bond and share feelings with one another (Ransdell et al., 2001). Working toward a common goal appears to bring forth feelings of togetherness and enhances motivation to stick with the behaviors necessary to reach the goal. In a qualitative study, Dacey, Baltzell, & Zaichkowsky (2003) found that women who participated regularly in group exercise felt that being part of a group was essential to their involvement in physical activity and that having companionship and camaraderie with a friend helped them maintain vigorous physical activity.

Research suggests that there may be both gender and age differences in the effect of social influence on physical activity (King, Blair, Bilds, Dishman, & Dubbert, 1992). The effects of gender differences in social influence on physical activity were examined in a study conducted by Troped and Saunders (1998). The researchers identified that women reported greater motivation than men to comply with “most people,” “my regular doctor,” “spouse,” and “parents.” Differences in social influence between men and women were also identified in different stages of exercise. Gender differences in normative beliefs and social influences were greater at earlier stages of exercise adoption rather than in the later stage of maintenance.

Age-related differences are reported to exist for the impact of perceived social support on physical activity adherence (Brassington, Atienza, Perczek, DiLorenzo, & King 2002; Chogahara, OBrien Cousins, & Wankel, 1998; Oka et al., 1995; Wankel, Mummery, Stephens, 1994). In middle-aged adults, social support has been shown to enhance the opportunity to bond, to feel more confident about participating in physical activity, and to facilitate enhanced adherence. However, the social networks for older adults are very weak in relation to younger individuals (Stephens & Craig, 1990). Some researchers have found that social support may not facilitate adherence to physical activity in older adults (Brassington et al., 2002, Howze, Smith & DiGilo, 1998). It is possible that factors such as health-related problems are more important correlates of physical activity adherence than social support in elderly populations. In older women, social support may be a less influential predictor of adherence (Rhodes, Martin, & Taunton, 2001) than for younger women. In younger women social support may be more

influential in predicting moderate to vigorous physical activity participation (Dacey et al., 2003). Further attention is required to examine the effect of age on social support and adherence.

Kirchhoff et al. (2008) demonstrated the need for social support to be maintained over time rather than just at initiation or for a limited time frame. The researchers recommend that interventions should make social support more permanent for exercisers and suggest interventions promoting a family physical activity plan over time. People who engage in exercise with family members or friends, and feel listened to, encouraged and appreciated by family and friends, have increased social support (Sallis & Hovell, 1990). Social support specific to exercise has been found to be a better predictor of exercise adherence than general social support (Oka et al., 1995). Social support in the current study is specific to an individual's perception of how much encouragement they receive from friends and family to be physically active and engage in exercise and wellness activities. This type of support also includes engaging in exercise with a family member or friend, which has been shown to increase adherence through bonding and task cohesion (Wallace et al., 1995).

Body Weight & Diet

Body weight and diet are strong correlates of physical activity. It is clearly supported that heavier individuals are less active than normal weight individuals and that changes in physical activity level are associated with changes in body weight (Boreham, Wallace & Nevill, 2000). Less is known about the extent to which weight is a predictor of physical activity, a consequence to physical activity, or a motivating factor for initiating

activity (Sherwood & Jeffery, 2000). Heavier individuals may be less active in part because exercise is less pleasurable. Heavier people have also been shown to experience feelings of discomfort or embarrassment while exercising in public because of their weight (Hooper & Veneziano, 1995). Ekkekakis & Lind (2006) agreed that heavier or overweight individuals demonstrate lower levels of adherence to exercise than healthy weight individuals and offered several theories as to why weight or weight satisfaction may influence adherence. First, compared to normal weight individuals, exercise is much more strenuous for an overweight individual which in turn offers a less pleasurable experience resulting in lower adherence. Second, overweight individuals or individuals who are not satisfied with their weight will approach exercise with a tendency for negative self-appraisals. These individuals then went on to report significantly higher levels of social physique anxiety, which resulted in negative emotion due to the belief that their bodies are being critically evaluated by observers.

In a pretest and a 2-year posttest survey of a sample of 3,672 working adults, a decrease in BMI (body mass index) was associated with an increase in physical activity in both men and women (Schmitz, French & Jeffery, 1997). Since regular physical activity has been shown to reduce these cardiovascular disease risk factors, improvement in these factors may serve as motivators for maintaining regular physical activity. Schmitz, French & Jeffery (1997) concluded that high body mass index and percent body fat can indicate weight problems as well as fitness; weight reduction and improved physical fitness may be outcome expectancies of women who engage in regular physical activity.

Active adults generally have healthier diets than sedentary adults (Perri et al., 2002). In the discussion of how eating, weight and exercise behavior might interact to positively influence health and exercise participation, those with better diets appear to be more satisfied with their weight and consequently stronger adherents to exercise (Emmons, Marcus, Linnan, Rossi & Abrams, 1994). Particularly in the short term, heavier adults who have shown no change in food intake with exercise are less likely to adhere to an exercise regimen (Woo, Garrow, & Pi-Sunyer, 1982). Interventions that provide a healthy behavioral alternative to overeating such as nutrition and diet counseling may be beneficial for those who have difficulty managing their weight and adhering to exercise. Moreover, improving one's diet can elicit positive self-appraisal and can be a motivator for exercise while providing more energy for sustained exercise (King & Tribble, 1991). The interaction between satisfaction of one's weight and diet and exercise warrants further investigation and can provide promising techniques for interventions to increase adherence.

Weight satisfaction appears to be a predictor of both initiation and maintenance of exercise. French et al. (1994) found that weight status can be a motivator for exercise. Individuals who are dissatisfied with their weight may use exercise as a means to reach their desired weight. Unfortunately, unless individuals are equipped with skills to successfully adhere to exercise, they may not achieve their desired results. Adherence to exercise would seem to be most common among those who are satisfied with their weight and use physical activity to maintain their weight. In this case, it would be important to target individuals who are less satisfied with their weight at the initiation of an exercise

program to ensure they have the skills necessary to adhere to exercise, which in turn may increase their positive self-appraisal. Interventions targeted at improving nutrition and diet may have an influence on weight satisfaction thereby increasing the probability for adherence.

Stress Management

High levels of stress directly influence many aspects of a person's life and are associated with poor health behavior patterns, including higher fat diets, smoking, and less frequent and lower levels of exercise (e.g., Allison, Adlaf, Ialomiteanu & Rehm, 1999; Ng & Jeffery, 2003). Research suggests that physical activity has a positive impact on mood and stress level (Gauvin, Rejeski, Norris, 1996). Aldana, Sutton, Jacobson & Quirk (1996) found that those who engage in higher levels of physical activity report lower levels of perceived stress. As exercise becomes more habitual, the impact of stressful events appears to diminish. Muraven & Baumeister (2000) suggested that because individuals report having a limited amount of energy available for exercise, the insufficient management of stress may decrease the available energy. Interventions targeted at improving stress management may help people anticipate and plan for stressful events, recognize these events as temporary impediments, and develop appropriate self-regulatory skills.

Stetson, Rahn, Dubbert, Wilner & Mercury (1997) conducted a prospective evaluation of the effects of stress on exercise adherence. The study examined the impact of stress on exercise behavior in a sample of female exercise maintainers. They found that both the number of stressful events and perceived stress in a week were associated

with more missed exercise sessions and less physical activity. Minor stress appeared to significantly disrupt exercise adherence and exercise-related cognitions. Perceived stress had the greatest impact on exercise behavior. The researchers discovered that during the weeks in which the women experienced frequent daily annoyances or heightened stress, they spent less time on each exercise, felt less confident that they would achieve their exercise goals, and experienced less enjoyment and satisfaction during exercise. Consequently, interventions targeting stress management may be beneficial for improving one's perception of how well he/she can manage stress thereby increasing confidence in dealing with uncontrollable daily disruptions.

Costakis, Dunnagan, & Haynes (1994) examined the relationship between habitual exercise and stress management in a group of university officials at differing stages of behavior change. They sought to identify if stress management was instrumental in achieving adherence. The researcher identified the subjects who made regular efforts to manage and reduce their stress three or four times per week. Adherence was found to be positively related to stress management. More specifically, those in the maintenance stage were twice as likely to make efforts to manage their stress as individuals in the lower stages of exercise behavior change.

Stress has been identified as a negative predictor of exercise (e.g., Gauvin, Rejeski, & Norris, 1996; Ng & Jeffery, 2003, Stetson et al., 1997). Stress management appears to be a tool used by those who have been able to maintain exercise (Costakis et al., 1994). The effects of age and gender on the relationship between stress management and adherence have not yet been examined. The current study examines one's perception

of their stress management as a predictor of adherence. Literature suggests that stress management is important in maintaining regular exercise. Stress appears to significantly impact exercise behavior and therefore, stress management would seem logical to combat stress and increase adherence.

Age & Gender

The prevalence of regular physical activity varies according to demographic characteristics (Sherwood & Jeffery, 2000). Casperson, Merritt, & Stephens (1994) suggested that the relationship with physical activity and age and gender remains unclear due to discrepancies in the operational definition of adherence, type of exercise, and country of origin for the sample population. Men and women have been found to have differing patterns of physical activity (Sallis et al., 1999; Caspersen, Powell & Christenson, 1985), suggesting the importance of gender specific research and interventions. Men are reported to be more physically active than women (Caspersen & Merritt, 1992; Casperson, Merritt & Stephens, 1994) as younger individuals are more active than older individuals (Dishman & Buckworth, 1996). Additionally, only 40% of American women participate in any form of regular physical activity (Caspersen & Merritt, 1995).

As with gender, age is a fixed variable but is important to consider. Participation in regular activity declines with age, with women experiencing a greater decline in older age groups than men (Caspersen, Merritt, Health, & Yeager, 1990). In a sample of 653 older women, Scharff, Horman, Kreuter & Brennan (1999) found that older women exercise at lower levels and less frequently than younger women. The percentage meeting

their definition of regular physical activity was significantly lower by age group; 59% in the youngest age category, age 30 and under, engaged in regular physical activity as compared with only 33% of those age 60 and older.

These differences suggest that the needs and skills required for adherence are likely to vary across different population subgroups and are factors that need to be understood. Little is known about gender and age differences in exercise determinants and adherence. The current study will examine the roles of gender and age in predicting regular participation in exercise among people with adherence to exercise. The following chapter will present the methodology for this study.

CHAPTER 3

METHOD

Participants

The current study uses a pre-existing data set for members at a fitness facility. Access to the data set was available through the fitness center's main computer system. IRB approval was granted by Madonna Hospital for use of the existing data set. Between June 2005 and June 2007 subjects agreed to membership at Madonna ProActive Medical Fitness Facility in Lincoln, Nebraska, and the data were collected from their records and participation. The members were attending the fitness facility for the first time and were naïve participants. The final sample for the present study consisted of 1622 participants who were members of the exercise facility for at least six months; 810 of those participants were members of the facility for at least one year. The 1622 participants (62.5% female, 37.5% male) were an average age of 50.68 years ($SD = 13.75$), with a range of 17 to 89 years. New members of the fitness facility were included in the study but teens and facility employees were excluded. Participants' data were codified to guarantee anonymity.

Materials

Demographic Variables

Age and gender were collected through the membership application.

ProActive Wellness Assessment (PWA)

ProActive Wellness Assessment (PWA) is a 60-item self-report measure that was designed to understand a respondent's satisfaction with self-efficacious factors that

implement and aid in maintaining healthy behavior change (Fleisher, 2005). The six dimensions of the assessment are: Social, Emotional, Occupational, Physical, Spiritual, and Intellectual/Creative. The six dimensions encompass the constructs of fitness planning and positive appraisal, weight and diet, physical self-awareness, positive communications, stress management, and emotional expression. Four subfactors emerged from a factor analysis that was used to predict adherence to exercise (Fleisher, 2005; see Table 2). Subfactors reflect whether an individual perceives they will have in success in the area. Higher scores on sub factors will indicate greater overall satisfaction and level of activity. Evidence of internal consistency ($\alpha = .77$ to $.96$) and factorial validity is provided for the ProActive Wellness Assessment (Fleisher, 2005).

Validation of the PWA. The PWA was validated in a study that included 303 participants in a corporate setting (Fleisher, 2005). Participants were Caucasian employees at a rehabilitation hospital who voluntarily joined a walking program with a stated desire to become more physically active. Participants completed pre and post measures (273 women and 30 men). Means and standard deviations for the self-report measures are presented in Table 3. PWA had good internal consistency both pre ($\alpha = .95$) and post ($\alpha = .96$). Table 4 displays psychometric properties of the PWA.

Scores from 303 participants who completed the PWA in the pilot walking study were factor analyzed using varimax rotation. An initial analysis resulted in 12 factors with eigenvalues greater than 1.0, accounting for 67.26 % of the variance. Examination of the scree plot (Figure 1) suggested a ten-factor solution. A ten-factor solution was selected, which accounted for 63.54% of the variance, whereas a nine-factor solution

explained 61.35%, an eight-factor solution accounted for 58.96%. Factor analysis confirmed three dimensions of wellness that assess the degree to which a person is satisfied with various areas of their lives (Occupational, Spiritual, and Intellectual/Creative) (Fleisher, 2005). The following three dimensions (Social, Emotional, and Physical) did not load after factor analysis. Additionally, factor analysis revealed that the PWA loaded on seven subfactors. Constructs that emerged were fitness planning and positive appraisal, body weight and diet, physical self-awareness, positive communications, stress management, social support, and emotional expression. The factor analysis revealed the presence of four factors that were used as independent variables in the current study. They included fitness planning and positive appraisal, social support, weight and diet, and stress management. Next, the four independent variables from the PWA used in this study will be reviewed.

Fitness Planning and Positive Appraisal (Items 31-32, 34-36, 44). This subfactor consists of items that measure physical activity, exercise enjoyment, exercise goals, and perceived ability to achieve exercise goals. Items used to measure this construct include, “I find physical activity enjoyable and energizing”, “I usually make an exercise plan (even if the plan is simply “in my head”) on a least a weekly basis”, “When I plan to exercise, I usually follow-through and do it”, “I engage in physical activity at least three times per week”, “I have a physical activity goal that I strive to attain.”

Social Support (Items 2, 4, 12, 33). This subfactor consists of items that measure the degree to which others encourage the respondent to engage in exercise and wellness activities. Items used to measure this construct include, “My family encourages me to

improve my physical and emotional wellness”, “My friends encourage me to engage in health activities, rather than activities that may diminish my wellness”, “I have a friend or family member with whom I can engage in wellness activities (exercise, relaxation)”, “My family and friends encourage me to manage stress effectively”, “I have friends or family that encourage me to exercise or be physically active”.

Body Weight and Diet (Items 37-39, 42-43). This subfactor consists of items that measure a person’s level of happiness with their current weight, fitness, and eating habits. Items used to measure this construct include, “I am happy with my current weight and fitness level”, “I am currently eating healthy, balanced meals”, “I am happy with my current physical appearance”, “I rarely eat more than I plan”, “I plan healthy meals and follow-through with making these meals.”

Stress Management (Items 13-15, 18). This subfactor consists of items that measure whether a person feels he/she can manage stress and emotions. Items used to measure this construct include, “I try to increase positive emotions (joy, peacefulness) when faced with a stressful situation”, “When I prepare myself for a stressor, I handle the stress well”, “I manage daily stress in an effective manner”, “I manage my emotions effectively.

Utilization Ratio

Utilization Ratio was calculated by dividing the total number of days a person attended the exercise facility (“check-ins”) by the total number of days the person was a member of the facility (“days active”). This ratio created an estimated average of exercise sessions/week since weekly data was not available. Once the member entered the facility,

the duration of the exercise was unable to be measured due to the unobtrusive nature of the study. It is assumed that the effort made by the member to attend the facility constituted at least the minimal requirement of 20 minutes of exercise set by the ACSM requirements. Although this assumption is viewed as a limitation, self-report is not used in this study to measure adherence, therefore eliminating the risk of memory bias or inaccurate recall.

Adherence

Adherence was defined as at least 180 days (six months) of active membership, which was measured in the data set as “days active.”

Procedure

Individuals interested in joining the fitness facility completed a membership application through membership services. Initial demographic data and membership data were collected by a membership employee and included age, gender, membership type, and start date. This information was entered into the fitness center’s main membership computer system. New members were also given a member code and scan card. Each time a member entered the exercise facility they scanned their member card and their attendance was automatically recorded into the membership computer system. New members agreed to a voluntary visit with an individual trainer at the fitness facility lasting approximately 30 minutes. During this visit, new members completed the Perceived Wellness Assessment (PWA) and Personal Wellness Profile (PWP). Follow-up was offered to members who wanted to discuss the results of either assessment. Data from the PWA and PWP, demographic data and membership data gathered from the

membership computer system was entered into SPSS by a researcher at Madonna Hospital. A Utilization Ratio was created from the membership data by the psychologist at the facility and also entered into SPSS. The data set was available through the hospital's main computer system and was accessed at Madonna ProActive. Only a portion of the data set was used in the current study and included:

(1) *Gender*

(2) *Age*

(3) *Member Type*, classified as either primary, associate, or senior. Member types that were excluded from the study included ProActive employees and teen members. These members were excluded because they are not representative of an adult sample and would limit the ability to generalize the study sample.

(4) *Date Join*, defined as the day a membership became active.

(5) *Date Cancelled*, defined as the day a membership was cancelled.

(6) *Days Active*, defined as the total number of days a person was a member of the facility.

(7) *Check-ins*, defined as the total number of days a member attended the facility.

(8) *Utilization Ratio*, created by dividing the 'check-ins' by the 'days active,' also known as the total number of days a member attended the facility divided by the total possible number of days a member could have attended the facility.

(9) *Medical Referral*, or whether a doctor had referred a participant to the fitness facility to engage in exercise associated with physical therapy.

(10) *Membership Status*, as either active or cancelled.

(11) *Fitness Planning and Positive Appraisal*, used to identify how well a person can plan and achieve their exercise goals. A higher score on this dimension means he/she enjoys exercise, tends to exercise on a regular basis, and feels that he/she can achieve his/her exercise goals when he/she plans to do so. A lower score on this dimension often means that he/she feels unsuccessful in his/her efforts to plan and implement fitness plans, and that he/she may not intrinsically enjoy exercise.

(12) *Social Support*, used to identify how much a person perceives he/she is supported by family and friends in his/her wellness efforts. Note that just because a score is low on this dimension, it does not mean that a person actually has poor support – it could be that he/she only perceives this and is not effectively reaching out to others.

(13) *Weight and Diet*, consisting of items that identify how happy a person is with his/her current weight, fitness and eating habits. A higher score on this dimension indicates that a person feels he/she is eating healthy on a regular basis, is happy with their his/her weight and physical fitness level, and eats balanced meals. A low score means he/she is unhappy with these factors.

(14) *Stress Management*, used to identify how well a person feels he/she can manage his/her stress and emotions. A higher score indicates that a person feels that he/she can manage stress effectively and a lower score suggests that a person is not managing stress or emotions as effectively as he/she may like.

CHAPTER 4

RESULTS

The purpose of this study was to identify behavioral factors that contribute to frequency of participation in exercise (i.e., Utilization Ratio) for participants with short- and long-term exercise adherence. By identifying the factors that contribute to regular participation in exercise, a greater understanding of how exercise can be actively participated in and maintained over time can be reached. In this study, Utilization Ratio was calculated by dividing the total number of days a person attended the exercise facility by the total number of days the person was a member of the facility. Short-term adherence was defined as exercise facility membership for at least six months (180 days). Long-term adherence was defined as facility membership for at least one year (365 days).

The four behavioral factors in the current study were subfactors of the ProActive Wellness Assessment (PWA), which was given to participants at initial membership. The first subfactor, Fitness Planning & Positive Appraisal, is defined as enjoyment of exercise, exercise on a regular basis, and feelings of achievement. The second subfactor, Social Support, is defined as encouragement from others to engage in exercise and wellness activities. The third subfactor, Weight & Diet, is defined as happiness with one's current weight, fitness, and eating habits. The fourth subfactor, Stress Management, is defined as the ability to manage stress effectively.

In addition to the four subfactors of the PWA, the demographic factors of age, gender, and Medical Referral (whether a doctor had referred the participant to the

exercise facility to engage in physical activity associated with physical therapy) were also variables of interest.

The data were checked for accuracy. Data cleaning was conducted to verify accurate data entry. The number of days a person was a member of the gym and the number of days he/she attended the gym were checked and recalculated to verify their accuracy. The final sample consisted of 1622 participants who were members of the exercise facility for at least six months (short-term adherence); 810 of these participants were members of the facility for at least one year (long-term adherence).

Short-Term Adherence Demographics

The 1622 participants who were members of the exercise facility for at least six months (short-term adherence) were an average age of 50.68 years ($SD = 13.75$), with a range of 17 to 89 years. Six-hundred-nine participants (37.5%) were male; 1013 (62.5%) were female. Only one participant responded “yes” to Medical Referral. The participants’ average Utilization Ratio was .215 ($SD = .175$), indicating participants’ average ratio of total days of facility attendance divided by the total days of facility membership.

Long-Term Adherence Demographics

The 810 participants (of the 1622) who were members of the exercise facility for at least one year (long-term adherence) were an average age of 52.57 years ($SD = 12.74$), with a range of 22 to 89 years. Three hundred fourteen (38.8%) were male; 496 (61.2%) were female. Again, the same participant ($n = 1$) responded “yes” to Medical Referral. The participants’ average Utilization Ratio was .211 ($SD = .173$), indicating participants’

average ratio of total days of facility attendance divided by the total days of facility membership.

Research Question One: How do the factors of (a) Fitness Planning & Positive Appraisal; (b) Social Support; (c) Weight and Diet; and (d) Stress Management predict frequency of participation in exercise (i.e., Utilization Ratio) among people with short-term adherence (at least six months) to exercise at a fitness facility?

Research Question One required an evaluation of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio for participants with short-term exercise adherence (at least six months of facility membership) via a linear regression analysis. The variable Medical Referral (whether a doctor had referred a participant to engage in physical activity at the exercise facility associated with physical therapy) was to be evaluated as well for any impact it might have on Utilization Ratio. However, for participants who had been members of the gym for at least six months, only one participant answered “yes” to Medical Referral. Therefore, Medical Referral was not included in the regression analysis.

Before the regression analysis was conducted, a correlation matrix was constructed for the four independent variables (Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management) and the dependent variable (Utilization Ratio) (see Table 5). All four of the independent variables were positively and significantly correlated with one another. Further, three of the four independent variables were correlated with Utilization Ratio. Fitness Planning & Positive Appraisal had the strongest relationship with Utilization Ratio, demonstrating a medium-sized correlation ($r = .30, p < .01$), indicating that stronger enjoyment of exercise, more

exercise on a regular basis, and greater feelings of achievement were related to more regular participation in exercise. Weight & Diet demonstrated a weak correlation with Utilization Ratio ($r = .16, p < .01$), indicating that greater happiness with one's current weight, fitness, and eating habits was related to more regular participation in exercise. Social Support demonstrated a weak correlation with Utilization Ratio, ($r = .10, p < .01$), indicating that more encouragement from others to engage in exercise and wellness activities was related to more regular participation in exercise. Stress Management demonstrated a positive, significant correlation with Utilization Ratio ($r = .05, p < .05$). Although the correlation is positive, the value is close to zero. Further, because of the large N, the correlation is significant. Therefore, Stress Management did not have a strong association with Utilization Ratio.

A linear regression analysis with simultaneous entry of independent variables was performed in which Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, Stress Management were simultaneously entered as independent variables to predict Utilization Ratio (see Table 6). The regression analysis yielded an overall significant model: $F(4, 1618) = 40.07, p < .001$. The R^2 value for the overall model was .09, or 9%, indicating that the set of independent variables accounted for 9% of the variance in Utilization Ratio, or regular participation in exercise. A significant unique contribution was found for only one variable: Fitness Planning & Positive Appraisal, or a person's enjoyment of exercise, exercise on a regular basis, and feelings of achievement ($\beta = .30, p < .001$).

Research Question Two: How do these same factors predict frequency of participation in exercise (i.e., Utilization Ratio) among people with long-term adherence (at least one year) to exercise at a fitness facility?

Research Question Two required an evaluation of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio for participants with long-term exercise adherence (at least one year of facility membership) via a linear regression analysis. For participants who had been members of the exercise facility for at least one year, only one participant answered “yes” to Medical Referral. Therefore, Medical Referral was not included in the regression analysis.

Before the regression analysis was conducted, a correlation matrix was constructed for the four independent variables (Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management) and the dependent variable (Utilization Ratio) (see Table 7). All four of the independent variables were positively and significantly correlated with one another. Further, all of the independent variables correlated positively and significantly with Utilization Ratio, except for Stress Management. Similar to the findings for the first correlation matrix from Research Question One (see Table 5), Fitness Planning & Positive Appraisal demonstrated the strongest correlation with Utilization Ratio with a medium-sized correlation ($r = .31, p < .01$), indicating that stronger enjoyment of exercise, more exercise on a regular basis, and greater feelings of achievement were related to more regular participation in exercise. Weight & Diet demonstrated a weak correlation with Utilization Ratio ($r = .14, p < .01$), indicating that greater happiness with one’s current weight, fitness, and eating habits was

related to more regular participation in exercise. Social Support demonstrated a very weak correlation with Utilization Ratio, ($r = .07, p < .05$), indicating that more encouragement from others to engage in exercise and wellness activities was related to more regular participation in exercise. Stress Management was not significantly correlated with Utilization Ratio ($r = .03, p > .05$).

A linear regression analysis with simultaneous entry of independent variables was performed in which Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, Stress Management were entered as independent variables to predict Utilization Ratio (see Table 8). The regression analysis yielded an overall significant model: $F(4, 806) = 21.91, p < 001$. The R^2 value for the overall model was .09, or 9%, indicating that the set of independent variables explained 9% of the variance in Utilization Ratio, or regular participation in exercise. A significant unique contribution was found for only one variable: Fitness Planning & Positive Appraisal, or a person's enjoyment of exercise, exercise on a regular basis, and feelings of achievement ($\beta = .34, p < .001$). The findings from this linear regression are similar to those found in Research Question One (Table 6).

Research Question Three: How does the predictive equation for Research Question One vary when considering gender and age?

Research Question Three required an examination of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio for participants with short-term exercise adherence, while *also* considering the impact gender and age. Gender and age were considered because research has identified both variables to be influential on people's patterns of physical activity

(Sallis, et al., 1999). Research Question Three was addressed via a hierarchical regression analysis.

Before the hierarchical regression analysis was conducted, a correlation matrix was constructed for the independent variables Age, Gender, Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management; and the dependent variable, Utilization Ratio (see Table 9). (Note: Because Gender is a dichotomous variable (1 = male, 2 = female), it was correlated with the other variables in the correlation matrix via point-biserial correlations. All other variables were correlated with one another via Pearson correlations.) All of the four subfactors of the PWA (Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management) were positively and significantly correlated with one another (identical to the correlation matrix in Table 5). Again, similar to Table 5, Fitness Planning & Positive Appraisal, Social Support, and Weight & Diet were all correlated with Utilization Ratio, with Fitness Planning & Positive Appraisal demonstrating the strongest correlation ($r = .30, p < .01$), followed by Weight & Diet ($r = .16, p < .01$), and Social Support ($r = .10, p < .01$). The correlation between Stress Management and Utilization Ratio was $.05 (p < .05)$.

Age was weakly correlated with Gender ($r = -.09, p < .01$), with older age associated with being male. Age was weakly correlated with Weight & Diet ($r = .19, p < .01$), with older age associated with more satisfaction with one's current weight, fitness, and eating habits. Gender was weakly correlated with Social Support ($r = .09, p < .01$), with females reporting more support by family and friends in their wellness efforts. Gender was slightly correlated with Weight and Diet ($r = -.05, p < .05$), although the

correlation value was close to zero (the significance of the correlation can be attributed to the large N). Both Age and Gender were uncorrelated with Utilization Ratio ($r = -.004$, $r = -.04$, respectively).

A hierarchical regression analysis was performed to determine the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio for short-term exercise adherence while *also* considering the impact age and gender (see Table 10). In Step One of the regression analysis, Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management were entered as one block (similar to the linear regression analysis in Research Question One). In Step Two, Age and Gender were entered as one block.

In Step One of the regression, a significant model was revealed: $F(4, 1618) = 40.07$, $p < .001$, with an R^2 value of .09, identical to the findings in Research Question One. Also, identical to Research Question One, only Fitness Planning & Positive Appraisal predicted Utilization Ratio ($\beta = .30$, $p < .001$). In Step Two of the regression, the (final) model was significant: $F(6, 1616) = 27.16$, $p < .001$. The R^2 change from Step One to Step Two was only .001, and it was not significant ($p > .05$). The final model had an R^2 value of .09, or 9%, indicating that the six independent variables together explained 9% of the variability in Utilization Ratio. In Step Two, again, only Fitness Planning & Positive Appraisal significantly contributed to the model ($\beta = .30$, $p < .001$) – this was no different from the findings in Step One. Age did not significantly contribute to the model ($\beta = -.01$, $p = .69$). Gender did not significantly contribute, either ($\beta = -.04$, $p = .11$).

Summary

In this study, three research questions were addressed. Research Question One required an evaluation of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio for participants with short-term exercise adherence (at least six months of facility membership). The results of a linear regression analysis with simultaneous entry of independent variables revealed that only Fitness Planning & Positive Appraisal, or a person's enjoyment of exercise, exercise on a regular basis, and feelings of achievement, significantly predicted Utilization Ratio. Further, the overall R^2 value for the model was .09.

Research Question Two also required an evaluation for the impact of Fitness Planning & Positive Appraisal, Social Support, Weight & Diet, and Stress Management on Utilization Ratio, but for participants with long-term exercise adherence (at least one year of facility membership). The results of a linear regression analysis revealed that, again, only Fitness Planning & Positive Appraisal significantly predicted Utilization Ratio. Again, the R^2 value was .09.

When taking into account age and gender in predicting Utilization Ratio for short-term exercise adherence (Research Question Three), again, only Fitness Planning & Positive Appraisal significantly predicted Utilization Ratio. Age and gender did not contribute to the model. Again, the R^2 value of the model was .09.

CHAPTER 5

DISCUSSION

The purpose of this study was to identify behavioral factors that contribute to frequency of participation in exercise among people with short-term (i.e., at least six months) and long-term (i.e., at least one year) exercise adherence at a fitness facility. In this study, *frequency of participation in exercise* was defined as the number of days a person has attended his/her exercise facility divided by the number of days he/she has been a member of the facility (i.e., Utilization Ratio). In this study, *adherence* was defined as gym membership for at least 6 months, also corresponding to the Transtheoretical Model as the *maintenance* stage of change (TTM, Prochaska & DiClemente, 1983).

This study was designed to contribute to our understanding of exercise adherence and the factors that lead to the continued participation in exercise. As exercise is known to combat illness and disease when sustained for lengthened periods of time (Bock, Marcus, Bernarding, Pinto & Forsyth, 2001; Mokdad, Marks, Stroup & Gerberding, 2004), it is important to identify how exercise can be maintained over time. Exercise adherence plays a vital role in maximizing the benefits associated with physical activity. Many people begin an exercise program, and find much difficulty in sustaining this behavior (Buckworth & Nigg, 2004; Dishman, 2001; Marcus, Rossi, Selby, Niaura & Abrams, 1992; Sallis, Hovell & Hofstetter, 1992.). This investigation of exercise adherence helped to clarify one behavioral factor (i.e., Fitness Planning & Positive Appraisal) by demonstrating its contribution to the maintenance of exercise. An

understanding of the behaviors involved in the Maintenance stage (i.e., regular exercise for at least six months”) of exercise change will result in an easier progression from the onset of an exercise program (Lippke & Ziegelmann, 2006).

This chapter will begin by highlighting the major findings of this study followed by a more in-depth interpretation of each of the three research questions. Next, implications will be highlighted as they relate to the fields of counseling psychology and health psychology. Next, implications will be highlighted as they relate to practice – interventions, prevention programs, or psychoeducational programs that would be applied in counseling, the public sector, or pro-social programming. The subsequent section will address limitations to the present study as well as recommendations for future research. Finally, conclusions will be given.

The Three Research Questions

Fitness Planning & Positive Appraisal, Weight and Diet, Social Support, and Stress Management were examined as predictors of Utilization Ratio for participants with short- and long- term exercise adherence at medical fitness facility in Lincoln, Nebraska. The sample consisted of 1622 participants who were members of the exercise facility for at least six months; 810 of those participants were members of the facility for at least one year. The 1622 participants (62.5% female, 37.5% male) were an average age of 50.68 years, with a range of 17 to 89 years. Adherence, in this study, is measured through member utilization of the fitness facility as it occurs in the participant’s natural setting without interference of the researcher. Findings from this study revealed Fitness Planning & Positive Appraisal as the only significant predictor of Utilization Ratio for both short-

and long- term exercise adherence. Fitness Planning & Positive Appraisal is a measure of physical activity, exercise enjoyment, exercise goals, and perceived ability to achieve those goals. The combination of these dimensions make Fitness Planning and Positive Appraisal an overall measure of a person's perceived ability to plan exercise through goal setting and a positive attitude towards exercise. Some specific items of Fitness Planning & Positive Appraisal include: "I usually make an exercise plan (even if the plan is simply 'in my head') on a weekly basis;" "I have a physical activity goal that I strive to attain;" and "I find physical activity enjoyable and energizing." Setting exercise goals and working toward a particular goal, as well as making a plan to exercise, lead to more frequent exercise for those with both short- and long-term adherence to exercise.

Research Question One required an evaluation of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight and Diet, and Stress Management on Utilization Ratio among participants with short-term exercise adherence. Fitness Planning & Positive Appraisal was the only significant predictor ($\beta = .30$). Although the predictive quality of Fitness Planning & Positive Appraisal was moderate, the R^2 value of the overall model was quite low (.09), indicating that only nine percent of the variation in Utilization Ratio was explained by the four subfactors of the PWA. Therefore, we must be cautious in stating that the results give any definitive implications. Yes, planning out exercise and setting exercise goals, a positive attitude toward physical activity in general, and self-confidence in the ability to maintain an activity program are important in predicting frequency of participation in exercise (for short-term exercise adherence), but

these behaviors are *moderate* predictors (in the present study). This study did not account for the other predictive variance of exercise adherence.

Research Question Two required an evaluation of the impact of Fitness Planning & Positive Appraisal, Social Support, Weight and Diet, and Stress Management on Utilization Ratio among participants with long-term exercise adherence. Again, Fitness Planning & Positive Appraisal was the only significant predictor, with a moderately sized level of prediction ($\beta = .34$). Social Support, Weight and Diet and Stress Management were not shown to be predictive. Again, although the predictive quality of Fitness Planning & Positive Appraisal was moderate, the R^2 value of the overall model was (again) quite low (.09), indicating that only nine percent of the variation in Utilization Ratio was explained by the four subfactors of the PWA. Therefore, we must be cautious in stating that the results give any definitive implications. Yes, planning out exercise and setting exercise goals, a positive attitude toward physical activity in general, as well as self-confidence in the ability to maintain an activity program are important in predicting frequency of participation in exercise (for long-term exercise adherence), but these behaviors are moderate predictors (in the present study). The predictive quality of Fitness Planning & Positive Appraisal was quite similar for both short and long-term adherence. These results may indicate that the individuals who adhered to an exercise program set a plan and were positive and confident not only in the short-term, but carried these qualities into the long-term. Therefore, it is important to plan out exercise, set goals, and maintain a positive attitude toward physical activity not only when beginning an exercise program, but also on a longer-term basis. As one maintains exercise over the long term, it remains

equally as important to continue with these tasks. It is also important to consider the possibility that those participants who were members of the exercise facility for at least six months (short-term adherence) but not members for at least one year (long-term adherence) continued to participate in exercise outside the facility. This study was only able to measure exercise that was participated in through membership to the facility. In the case that those participants who were not members of the facility for at least one year continued to exercise after termination of their membership, the predictive power of Fitness Planning & Positive Appraisal may be quite similar for both groups.

One possible explanation for the lack of predictive ability of Social Support, Weight and Diet, and Stress Management may be the large age range of participants in the present study (from 17 to 89 years of age). With a narrower age focus (older adulthood, for example), there may have been different results. Perhaps having narrowed the sample down to the older set of participants would have demonstrated more predictive power because there is a more "nuanced" finding with the older participants -- perhaps including very young participants takes away this nuanced predictive power. For example, the correlation matrix in Table 9 shows that age was correlated with Weight & Diet, with older participants feeling more confident in their weight. Further, Weight & Diet was positively correlated with Utilization Ratio – those who were more content with their weight engaged in more frequent exercise participation. Perhaps for those in middle adulthood and later adulthood with more body satisfaction, there is more predictive power for Weight & Diet on Utilization Ratio.

Research Question Three took into account age and gender in predicting Utilization Ratio among participants with short-term exercise adherence. Neither age nor gender contributed significantly to the predictive equation. Research has shown that participation in regular activity declines with age, with women experiencing a greater decline in older age groups than men (Caspersen, Merritt, Health, & Yeager, 1990). It is difficult to determine why neither age nor gender contributed to the prediction in the current study. Narrowing the sample to a subgroup of the population (middle adulthood or older adults, for example) may have generated different results by increasing the predictive power of age. Analyzing subgroups defined by age is recommended for future research.

Implications for Counseling Psychology and Health Psychology

The major consensus is that the factors associated with exercise adherence are both complex and diverse (Buckworth & Nigg, 2004; Lippke & Ziegelmann, 2006; Schwarzer, 2008; Sherwood & Jeffery, 2000; Speck & Harrell, 2003) with a wide variety of variables that have been inconsistently studied (Dishman, Sallis & Orenstein, 1985; Sallis, 2001). What constitutes successful maintenance remains unresolved. With a goal of maintenance in mind, examining factors that control behavior, rather than factors that cannot be changed will add to the applicability of adherence research (Abraham et al., 1999). Although researchers have studied a wide array of potential influences on physical activity among adults, this study focuses on factors that can be modified, such as fitness planning and social support, rather than on factors that cannot be changed. Research findings that specify behavioral indicators of exercise adherence have the most

application in designing interventions. Behavioral indicators provide direction about how to develop new behavioral routines that would promote exercise adherence. By focusing on the factors that should produce changes in behavior, interventions can be used to help individuals adapt to desirable behaviors. This study adds to the research by identifying Fitness Planning and Positive Appraisal as a predictive factor of adherence that identifies behaviors that can be targeted for changes. Previous research has acknowledged that although many people intend to exercise, they remain sedentary (Schwarzer, 1992). Fitness Planning is a behavioral response used to help people achieve specific goals. Changing health behaviors such as regular physical exercise involves self-regulation processes that address the pursuit of these goals (Ziegelmann & Lippke, 2007). Gollwitzer (1996) argues that there should be greater emphasis on this process through planning concepts. This study highlighted not only the importance of forming a plan but also made evident the significance of simply forming a mental representation of the target situation. Although fitness planning had been discussed in the research through goal setting (Keffe & Blumenthal, 1980; Salis & Hovell, 1990), scheduling (DuCharme & Brawley, 1995; Young, 2005), self-monitoring (Salis & Hovell, 1990) and the use of diary logs (Sniehotta, Schwarzer, Scholz, & Schuz, 2005), this study brought to light the importance of structuring a plan if even only in one's head. One item used to measure the factor, Fitness Planning & Positive Appraisal, included: "I usually make an exercise plan (even if the plan is simply in my head) on at least a weekly basis." Also, adding to Fitness Planning is a piece on Positive Appraisal. This study combined these constructs (the planning of exercise and valuing of exercise) under one factor (Fitness Planning &

Positive Appraisal). Research has acknowledged the existence of a positive relationship between fitness planning and exercise appraisal (Boyd & Yin, 1999) in that those who value exercise as an activity that brings enjoyment and feelings of well-being are more likely to follow through with exercise (Young, 2005). For some, enjoyment may be developed by bodily changes that can be produced through exercise such as weight loss or increase of muscle tone (Okonski, 2003). Maintaining a level of enjoyment can motivate an individual to continue with exercise (Okonski, 2003). Anshel & Kang (2007) found that when an individual believes that changing the negative habit (i.e., lack of exercise) is either undesirable or beyond their control, a change in behavior is unlikely to occur. They add that by asking individuals to acknowledge the costs and long-term consequences of their negative habits, new exercise values can be formed. Only when exercise is consistent with one's values will an individual commit to behavior change by developing and carrying out an action plan. According to Hausenblas, Carron and Mack (1997), individuals have the greatest commitment to exercise when they hold favorable beliefs about the exercise and believe that they can successfully perform the behavior. The results of this study indicate that during the planning process, positive cognitions are an important piece in one's ability to structure and follow through with a plan. Additionally, these results add to previous research by acknowledging that our attitudes and beliefs about exercise are an important part of the planning process and should be considered in conjunction with fitness planning. Previous research (Gollwitzer, 1999; Hausenblas, Corran, & Mack, 1997; Young, 2005) has touched on the influence of our attitudes on exercise adherence but has not demonstrated the importance of incorporating

the development of positive attitudes as a major component of the planning process and consequently in the prediction of both short and long-term adherence. Young (2005) suggested cognitive restructuring to improve one's perception of exercise, thereby leading to the prioritization and follow through of the exercise. The results of this study add to the knowledge base by piecing together planning and appraisal, making both positive appraisal and planning important constructs in the process of maintaining behavior change. This study offers a potential vehicle with which to engage the individual cognitively and emotionally through behavioral planning to encourage health behavior change. The knowledge may also be used to guide counselors in developing interventions that lead to the maintenance of behaviors that will allow their clients to live a healthy lifestyle.

Adherence definitions vary throughout the literature making it difficult to compare the results of studies. Many studies refer to adherence without specifying the period of time exercise was sustained (Izquierdo-Porrera, Powell, Reiner & Fontaine, 2003; Perri et. al, 2002; Wilcox & King, 2004). Without a way to describe exercise participation through temporal units, research findings will continue to measure adherence inconsistently. The Transtheoretical Model of Change (TTM) accepts that six months is an appropriate timeframe for behavior change to become imbedded (Prochaska & DiClemente, 1983). Using the TTM, short-term adherence was referred to as exercise sustained for at least six months. Long-term adherence was referred to as exercise sustained for at least one year. This study offers a clear definition of adherence, which is lacking in previous research studies of adherence. Using the same definition of adherence

would not only help in the replication of the current findings but would also enhance the interpretability and application of future research (White, Ransdell, Vener & Flohr, 2005).

Finally, this study adds to research by using a more objective measure of adherence by measuring exercise adherence in a naturalistic setting without the use of self-report. By eliminating measurement through self-report a more accurate measure of exercise participation is achieved. Although the use of self-report is advantageous, the measurement of adherence in this study is still limited due to the measurement of adherence through attendance at a fitness center. It cannot be known for sure that a person exercised, only that they entered the fitness center. Additionally, the length of time spent exercising and the type of exercise in which one participated was unknown.

Implications for Practice

Understanding the variables that influence regular participation in exercise and applying this knowledge to individual situations can assist in maintaining the habits associated with a healthy lifestyle. Counselors and other mental health professionals must have a general understanding of exercise when incorporating exercise into a counseling session or adding exercise to a client's treatment plan (Okonski, 2003). Individuals often initiate and attempt to continue exercise programs without the benefit of having acquired the necessary skills needed to maintain exercise. There is little research on the specific counseling techniques necessary for adherence to an exercise program and no clear steps that a professional may follow when using exercise as a counseling intervention (Okonski, 2003). Of the behavioral factors that affect the individual's tendency to

maintain an exercise program examined in this study, the most significant is Fitness Planning & Positive Appraisal. It is useful for mental health or exercise professionals to apply this knowledge when attempting to provide services/interventions and incorporate exercise into treatment and the counseling process. Findings from this study indicate that interventions or psychoeducational programs should incorporate the behavioral technique of Fitness Planning and Positive Appraisal by helping individuals set goals, plan activity, and form a positive attitude about the exercise. Initially, it is important for a counselor to develop goals that are individualized to meet the client's needs. A client's needs should be clearly identified in order to determine one's individually tailored goals (Locke & Latham, 1990; Okonski, 2003). Goal setting is most useful when the goals are realistic and specific. Helping individuals set goals that can be reached will ensure future success and increase self-efficacy (Annesi, 1996). By setting unreasonable goals, exercise may seem like an overwhelming task (Locke & Latham, 1990). A counselor's role may be to stop a client from doing too much too soon resulting in loss of interest or loss of self-efficacy. A counselor can help the client develop feelings of self-efficacy by forming goals that are challenging, yet attainable (Dishman & Buckworth, 1997).

In conjunction with goal setting, *Contracting* is a technique that can be used by a mental health counselor to increase adherence to exercise (Wysocki, Hall, Iwaa, & Riordan, 1979). Okonski (2003) suggests that counselors using this intervention should develop a contract that clearly describes the exercise program, the clients' goals, the client's perceived benefits to exercising, and what is expected from the client (e.g. which days the client will exercise). A behavior contract is useful in creating intrinsic

motivation, increasing locus of control (Hermon & Hazler, 1999; Kelley & Stokes, 1982), and encouraging self-determination (White-Blackburn, Semb, & Semb, 1977). Self-determined forms of behavioral regulation (i.e., intrinsic regulation) in which behavior is for enjoyment and reflected in feelings of “want” rather than “ought” or “should”, are likely to be associated with positive behavioral, affective, and cognitive outcomes (Biddle, Soos & Chatzisarantis, 1999; Deci & Ryan, 1985). Less self-determined forms of behavioral regulation (i.e., external regulation) in which behavior is controlled by external authority, fear or guilt, may result in negative consequences such as anxiety or low adherence (Biddle, Soos & Chatzisarantis, 1999). Therefore, positive outcomes can be achieved by increasing an individual’s intrinsic motivation (e.g., “I exercise because I enjoy the way it makes my body feel”) (Biddle, Soos & Chatzisarantis, 1999). Before developing the contract, the mental health or exercise professionals should begin by evaluating an individual’s stage of change in order to set appropriate goals and giving them the challenge of changing a behavior (Izawa, Oka, & Watanabe, 2006). A person in the preparation stage of change (I currently exercise some, but not regularly) may set different goals than someone in the action or maintenance stage of change. One possible goal for someone in the Preparation Stage may be to join an exercise facility whereas a goal of someone in the Action or Maintenance Stage may be to increase a certain type of activity. Fitness planning is an important piece to the contract. Action planning (i.e., plans on “when”, “where”, and “how” to perform a behavior) can bridge the gap between intentions and behavior, leading to follow through of the planned behavior (Gollwitzer, 1999; Sniehotta, Schwarzer, Scholz, & Schuz, 2005; Ziegelmann & Lippke, 2007). For

example, if a client's goal is to walk four days per week for 30 minutes each day, the professional should help the client identify when they will walk (days, times), the location of where the walking will take place, and how they plan to do so (alone or with a friend). Planning activity can help an individual get into a natural routine (DuCharme & Brawley, 1995). Maddox (1993) contends that developing an exercise routine by planning the time and location of most exercise sessions will facilitate exercise adherence. Keeping a record or logging activity in a day planner or journal can assist a client in planning activity (Sniehotta et al., 2005). Scheduling exercise (i.e., deliberate decision-making that requires an individual to plan exercise into their daily/weekly schedule) has been found to be useful in dealing with time as a barrier to maintain long-term adherence (DuCharme & Brawley, 1995). Treating exercise as a behavior that can be planned into an individual's everyday life and viewing the changed behavior as a positive self-promoting endeavor will increase the probability that it can be sustained over a longer period of time. Signing the contract assumes client responsibility for the exercise program and the goals become intrinsically embedded (Okonski, 2003).

In an effort to help a client form and maintain a positive outlook on exercise, the counselor should help a client develop an exercise program that is enjoyable by guiding the client to choose activities they enjoy (Dacey, Baltzell, Zaichkowsky, 2003). Those who believe and value exercise as an enjoyable activity have been found to adhere to exercise through the prioritization and follow through of the planned behavior (Okonski, 2003; Young, 2005). In the case that a client cannot find enjoyment in an exercise activity, the counselor should encourage the client to focus on the enjoyment in living a

healthy lifestyle and being physically fit (Okonski, 2003). Belief in the value of exercise for one's specific benefit has been linked to a greater possibility of maintaining exercise as a lifestyle change (Dishman, Sallis & Orenstein, 1985; Hausenblas, Carron & Mack, 1997). Dunn & Blair (1997) suggest that counselors provide individuals with education or consciousness-raising about the benefits of exercise and the risks of sedentary behavior to motivate them to become physically active and maintain activity. However, Berger, Pargman, & Weinberg (2002) warn that simply emphasizing the relationship between disease prevention and regular exercise is not enough to keep most people physically active. Their research emphasizes that counselors help their clients develop positive inner experiences (i.e., intrinsic motivation) to promote adherence by guiding a person to use their self-identified values as a motivator for starting and maintaining exercise.

Limitations and Recommendations for Future Research

This study had limitations inherent to the study design. Higher membership costs (\$65/month plus enrollment fee for adults, \$43/month plus enrollment fee for seniors over the age of 65), with decreased minority representation, could have confounded the outcomes. Participants of this study were predominantly white and middle-class, and in their 50s. These participants were members of a premier medically based health and fitness facility in Lincoln, Nebraska. Therefore, results may not be generalized to ethnically diverse group or lower-income populations including individuals who do not have to resources or access so such a facility.

The nature of the data did not allow for the exploration of exercise activity that a person was engaged in after entering the gym (for example running on a treadmill for 30

minutes vs. lifting weights for five minutes). It was assumed that the member exercised, but the type of exercise that was participated in as well as the amount of time spent exercising was unknown. Identifying these factors would have increased the validity of the adherence measure and should be considered in future research. Additionally, the reasons for discontinued membership to the exercise facility were unknown.

Approximately half the participants who were members of the exercise facility for at least six months (short-term adherence) were members of the facility for at least one year (long-term adherence). It is unknown whether discontinued membership was indicative of drop out (discontinuation of exercise) or if these members outside the facility maintained exercise. This limitation may have affected the predictive quality of the independent variables on adherence.

Another limitation of the study that may have affected the predictive quality of the independent variables was in the validity of the PWA (ProActive Wellness Assessment). The PWA was piloted on a group of primarily Caucasian females in a walking study. Following the walking intervention, a factor analysis revealed the presence of four factors that were used as the independent variables in this study. The construct validity of the measure has not been definitively established because so few research studies have utilized the measure. Fitness Planning & Positive Appraisal is a factor made up of multiple dimensions that may have more predictive quality when broken down in to its component parts. The multidimensionality of the measure also makes it difficult to specifically determine what is predicting exercise adherence. Future research should break this factor down into (1) fitness planning and (2) positive appraisal

to examine them both separately and as they interact. Additionally, future research may also include more specific items for measuring fitness planning (i.e., plans on “when”, “where” and “how” to perform a behavior). The items in the current study broadly measure fitness planning (i.e., “I usually make a plan to exercise (even if the plan is simply in my head) on at least a weekly basis”) and do not measure the component parts of planning.

While previous research has demonstrated that individuals benefit from planning (Sniehotta, Schwarzer, Scholz, & Schuz, 2005; Ziegelmann & Lippke, 2007), the current study provides evidence for the potential mediating mechanisms between planning and positive appraisal. By engaging an individual cognitively and emotionally during the planning process, further changes in health behavior are possible. As there is a positive relationship between fitness planning and exercise appraisal (Boyd & Yin, 1999), future research should examine behavioral scripts, tactics, and strategies for planning interventions. Although findings of previous research indicate that positive effects of planning depend on strategy quality (strategies for pursuing and maintaining personally relevant goals) (Diefendorff & Lord, 2003), interventions for pursuing and maintaining a plan and positive attitude towards exercise necessitate further research. Research has only briefly touched upon specific techniques that will bring the most success in exercise adherence (Okonski, 2003). Contracting, for example, is one technique that warrants future research. Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks (2004) concluded that the results of most behavioral and health promotion studies have not been translated into practice. Future research using an approach to fitness planning that includes the

cognitive development of exercise as an enjoyable and valued activity is warranted. Additionally, identifying the cognitive substrates that impair the planning process can help guide treatment interventions that modify these cognitive substrates and develop new behavioral routines.

As the independent variables, Fitness Planning & Positive Appraisal, Weight and Diet, Social Support, and Stress Management only explained a very small amount of the variance in exercise adherence, it is important that future research continue to explore both the factors influencing exercise among adults (determinants research) and the effectiveness of strategies and programs to increase this behavior (interventions research). A greater understanding of how one's beliefs and values influence subsequent actions is needed in exercise research. Loehr and Schwartz (2003) contend that promoting and maintaining any health-enhancing behavior requires the development of scheduled routines or habits that are linked to a person's deepest values. The researchers explain negative habits and behaviors (poor nutrition/diet, high stress, lack of exercise) as reflecting a lack of firm beliefs and values. Examining the link between value and behavior can guide the future of adherence research and help determine which behavioral factors are most salient in predicting long-term exercise.

Conclusion

Participation in regular exercise contributes positively to physical and psychological health (Perri et al., 2002). With the increasing levels of obesity and inactivity in adults and adolescents in the United States, the need toward increasing physical health has become apparent. Furthermore, it is well established that physical

activity is an effective way to reduce the risk of chronic and acute diseases such as heart disease, colon cancer, diabetes, and falls/fractures (Sallis & Owen, 1999; U.S. Department of Health and Human Services [USDHHS], 1996). Research has demonstrated that counseling interventions involving exercise decrease symptoms of depression (Martinsen & Morgan, 1997) and anxiety (Raglin, 1997), reduce stress (Roth & Holmes, 1985), and increase self-esteem (Sonstroem, 1997).

Although the research on the study of exercise adherence suggests a variety of factors are responsible for determining whether or not an individual stays in an exercise program, many of the findings provide little information of practical significance to the mental health or exercise professional (Leith & Taylor, 1992). It has become important to identify the factors that control behavior in order to translate the findings into workable guidelines for developing interventions that change behavior (Ameritage & Arden, 2002; Dishman & Buckworth, 1996; Sallis & Owen, 1999).

The results of this study suggest that positive appraisal and planning are important factors in the maintenance of exercise. Further, it appears that the constructs of greatest interest, those related to positive appraisal of one's attitude towards exercise and their ability to make a plan are the most salient for predicting behavior change outcomes through successful initiation and maintenance of exercise. These results reinforce the value of focusing on cognitive factors when attempting to facilitate behavior change through planning. Overall, this study's findings contributed to the understanding of exercise adherence and provided behavioral direction for future research and the design of more practical and effective health promotion and counseling interventions.

Table 1

Stages of Change Model Descriptors

Stage (Prochaska & Marcus, 1994)	Stage of change description (Buxton, Wyse & Mercer, 1996)	Descriptors of stages of change for exercise (Marcus, Rakowski & Rossi, 1992)
1. Precontemplation: Uninformed/demoralised/ Defensive	No intention to change behavior	I currently do not exercise and I do not intend to start in the next six months
2. Contemplation: Ambivalent	Considering change	I currently do not exercise but am thinking about starting to exercise within the next six months
3. Preparation	Small change in behavior	I currently exercise some, but not regularly
4. Action: Least stable stage, most risk of relapse	Actively engaged in Behavior	I currently exercise regularly, but have only begun doing so less than six months
5. Maintenance	Behavior sustained over Time	I currently exercise regularly and have done so for at least six months

Note: Regular exercise is defined as a minimum of three sessions of 20 minutes of vigorous exercise per week (ACSM, 1990).

Table 2

ProActive Wellness Assessment (PWA) Subfactors (Fleisher, 2005)

Independent Variables	Measured By:
Fitness Planning & Positive Appraisal <ul style="list-style-type: none"> • <i>Items measure physical activity, exercise enjoyment, exercise goals, and perceived ability to achieve exercise goals.</i> 	31. I find physical activity enjoyable and energizing. 32. I usually make an exercise plan (even if the plan is simply “in my head”) on at least a weekly basis. 34. When I plan to exercise, I usually follow-through and do it. 35. After I exercise I feel a sense of accomplishment. 36. I engage in physical activity at least three times per week. 44. I have a physical activity goal that I strive to attain.
Body Weight & Diet <ul style="list-style-type: none"> • <i>Items measure level of happiness with current weight, fitness, and eating habits.</i> 	37. I am happy with my current weight and fitness level. 38. I am currently eating healthy, balanced meals. 39. I am happy with my current physical appearance. 42. I rarely eat more than I plan. 43. I plan healthy meals and follow-through with making these meals.
Stress Management <ul style="list-style-type: none"> • <i>Items measures whether respondent feels he/she can manage stress and emotions.</i> 	13. I try to increase positive emotions (joy, peacefulness) when faced with a stressful situation. 14. When I prepare myself for a stressor, I handle the stress well. 15. I manage daily stress in an effective manner. 18. I manage my emotions effectively.
Social Support <ul style="list-style-type: none"> • <i>Items measure the degree to which others encourage the respondent to engage in wellness activities.</i> 	2. My family encourages me to improve my physical and emotional wellness. 4. My friends encourage me to engage in health activities, rather than activities that may diminish my wellness. 5. I have a friend or family member with whom I can engage in wellness activities (exercise, relaxation). 12. My family and friends encourage me to manage stress effectively. 33. I have friends or family that encourages me to exercise or be physically active.

Table 3

Means and Standard Deviations of ProActive Wellness Assessment (PWA) Pre and Post Measures (Fleisher, 2005)

Dimension/ Construct	Females				Males			
	Pre		Post		Pre		Post	
	M n = 273	SD	M n = 182	SD	M n = 30	SD	M n = 21	SD
Social	5.19	.67	5.13	.62	5.07	.63	4.90	.64
Emotional	4.70	.57	4.64	.63	4.66	.73	4.59	.63
Occupational	5.13	.61	5.09	.68	5.03	.69	4.89	.75
Physical	3.70	.99	4.14	.80	3.72	.92	4.08	.87
Spiritual	4.69	.99	4.79	.95	4.78	.90	4.90	.86
Intellectual/Creative	4.83	.75	4.88	.80	4.96	.62	4.89	.72
FPPA	4.36	1.11	4.68	.91	4.46	.95	4.70	.91
WE	3.28	.23	3.79	1.02	3.49	1.15	3.67	1.20
PSA	3.26	1.26	3.66	1.07	2.94	1.23	3.40	1.42
PC	5.42	.65	5.28	.67	5.41	.52	5.20	.66
SM	4.65	.75	4.63	.76	4.78	.84	4.74	.65
SS	4.73	.85	4.80	.77	4.51	.94	4.45	.72
EE	5.01	.74	4.96	.69	4.71	.87	4.65	.69

Note: FPPA = fitness planning and positive appraisal, WE = weight and eating, PSA = physical self-awareness, PC = positive communications, SM = stress management, SS = social support, EE = emotional expression

Table 4

Psychometric Properties of ProActive Wellness Assessment (PWA; Fleisher, 2005)

Study Variable	α		Study Variable	α	
	Pre	Post		Pre	Post
PWA (Items 1-60)	.95	.96	Fitness Planning and Positive Appraisal (Items 31-32, 34-36, 44)	.88	.87
Social (Items 1-9)	.85	.85	Weight and Eating (Items 37-39, 42-43)	.87	.84
Emotional (Items 10-18)	.74	.79	Physical Self-Awareness (Items 29-30, 40-41)	.89	.91
Occupational (Items 19-28)	.87	.90	Positive Communications (Items 1, 6-8)	.83	.85
Physical (Items 29-44)	.93	.91	Stress Management (Items 13-15, 18)	.81	.84
Spiritual (Items 45-52)	.91	.93	Social Support (Items, 2, 4-5, 12, 33, 59)	.82	.82
Intellectual/Creative (Items 53-60)	.89	.92	Emotional Expression (Items 3-4, 9, 16-17)	.78	.77

Figure 1

Scree Plot of ProActive Wellness Assessment (PWA; Fleisher, 2005)

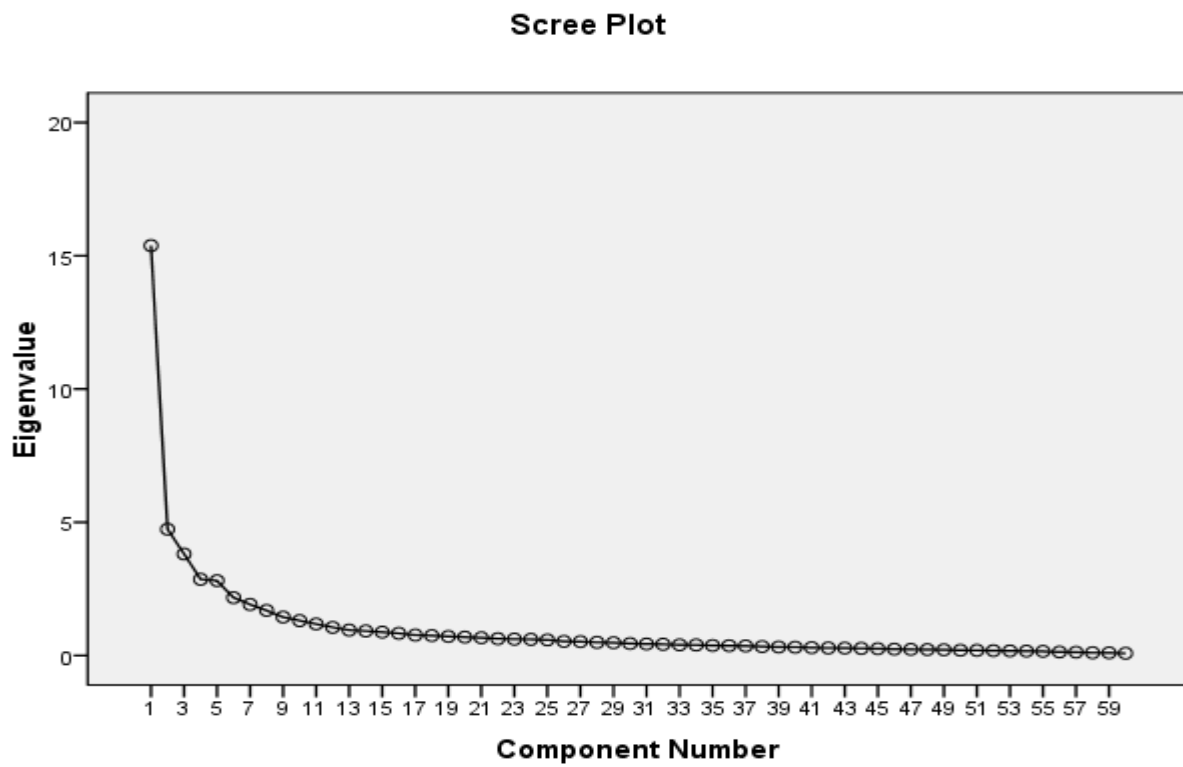


Table 5

*Descriptive Statistics and Intercorrelations among the Independent Variables and Dependent**Variable (Short-Term Adherence)*

<i>Variable</i>	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. FP & PA	1622	4.06	1.20	—				
2. Soc. Supp.	1622	4.84	.85	.34**	—			
3. WT & DT	1622	3.13	1.14	.56**	.24**	—		
4. Stress Man.	1622	4.71	.84	.26**	.40**	.30**	—	
5. UR	1622	.21	.17	.30**	.10**	.16**	.05*	—

Note. FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management; UR = Utilization Ratio. * $p < .05$, ** $p < .01$, two-tailed

Table 6

Linear Regression Analysis for Variables Predicting Utilization Ratio (Short-Term Adherence)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
FP & PA	.04	.004	.30***	10.21	.000
Soc. Support	.003	.01	.01	.47	.64
WT & DT	.000	.004	.000	-.01	.99
Stress Man.	-.01	.01	-.03	-1.28	.20

Note. FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management. $N = 1622$. $R^2 = .09$. Overall model: $F(4, 1618) = 40.07, p < .001$. *** $p < .001$, two-tailed

Table 7

*Descriptive Statistics and Intercorrelations among the Independent Variables and Dependent**Variable (Long-Term Adherence)*

<i>Variable</i>	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. FP & PA	810	4.05	1.21	—				
2. Soc. Supp.	810	4.81	.88	.33**	—			
3. WT & DT	810	3.14	1.14	.56**	.26**	—		
4. Stress Man.	810	4.69	.86	.26**	.43**	.30**	—	
5. UR	810	.21	.17	.31**	.07*	.14**	.03	—

Note. FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management; UR = Utilization Ratio.

* $p < .05$, ** $p < .01$, two-tailed

Table 8

Linear Regression Analysis for Variables Predicting Utilization Ratio (Long-Term Adherence)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
FP & PA	.05	.01	.34***	8.28	.000
Soc. Support	-.003	.01	-.01	-.37	.71
WT & DT	-.01	.01	-.04	-.92	.36
Stress Man.	-.01	.01	-.04	-1.19	.23

Note. FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management. $N = 810$. $R^2 = .09$. Overall model: $F(4, 806) = 21.91, p < .001$. *** $p < .001$, two-tailed

Table 9

Intercorrelations among the Independent Variables and Dependent Variable (Short-Term Adherence)

<i>Variable</i>	<i>n</i>	1	2	3	4	5	6	7
1. Age	1622	—						
2. Gender	1622	-.09**	—					
3. FP & PA	1622	.01	-.001	—				
4. Soc. Supp.	1622	-.02	.09**	.34**	—			
5. WT & DT	1622	.19**	-.05*	.56**	.24**	—		
6. Stress Man.	1622	.04	.04	.26**	.40**	.30**	—	
7. UR	1622	-.004	-.04	.30**	.10**	.16**	.05*	—

Note. Gender (1 = male, 2 = female); FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management; UR = Utilization Ratio. * $p < .05$, ** $p < .01$, two-tailed

Table 10

Summary of Hierarchical Regression Analysis for Variables Predicting Utilization Ratio (Short-Term Adherence)

<i>Variable</i>	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Step One					
FP & PA	.04	.004	.30***	10.21	.000
Soc. Supp.	.003	.01	.01	.47	.64
WT & DT	.000	.004	.000	-.01	.99
Stress Man.	-.01	.01	-.03	-1.28	.20
Step Two					
FP & PA	.04	.004	.30***	10.12	.000
Soc. Supp.	.003	.01	.02	.60	.55
WT & DT	.000	.005	-.001	-.03	.98
Stress Man.	-.01	.01	-.03	-1.24	.21
Age	.000	.000	-.01	-.40	.69
Gender	-.01	.01	-.04	-1.59	.11

Note. FP & PA = Fitness Planning and Positive Appraisal; Soc. Supp. = Social Support; WT & DT = Weight and Diet; Stress Man. = Stress Management; Gender (1 = male, 2 = female). $R^2 = .09$ for Step One; $\Delta R^2 = .001$ for Step 2 ($p > .05$); R^2 for Step Two = .09. $N = 1622$. Overall model: $F(6, 1616) = 27.16, p < .001$. *** $p < .001$, two-tailed

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