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SELF-EFFICACY AND HEALTH VALUE AMONG UNDERGRADUATES FOLLOWING A LIFETIME FITNESS COURSE

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by

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CERTIFICATE OF APPROVAL

DOCTORAL DISSERTATION

This is to certify that the Doctoral Dissertation of

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ABSTRACT

The question of whether perceived self-efficacy for exercise and health value, respectively, varied as a function of gender and exercise stage of change was the focus of this study. An archival data set was used. Participants were 190 college students who completed a demographic questionnaire, the Exercise Stage of Change Questionnaire, the Rokeach Values Survey, and the Self-Efficacy for Exercise questionnaire before and after completing a lifetime fitness course.

Two 2-factor analyses of covariance were conducted for each dependent variable, self-efficacy and health value. Gender and exercise stage of change were the independent variables. Exercise stage of change was divided into four subcategories: contemplation, preparation, action, and maintenance. A pretest on each dependent variable served as the covariate. Results of the analysis indicated that health value scores were significantly different as a function of exercise stage of change. A significant main effect was found between health value and exercise stage of change. A Bryant Paulson procedure was performed to determine which of the four stages of change for exercise differed on health value scores. The analysis revealed that participants in the contemplation and preparation exercise stages of change ranked health value significantly lower than participants in the action and maintenance exercise stages of change. Implications for theory and practice and recommendations for future research are discussed.

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Chapter 1

INTRODUCTION

Background

Over the past 40 years, the incidence of obesity in the United States population has increased by approximately 50% (Centers for Disease Control [CDC], 2005). Research findings indicate that the sharp increase is due in large part to the lifestyles of Americans. Currently, approximately 25% of the population is considered sedentary, while 60% of the population does not get the recommended amount of daily physical activity (CDC). Fifty-eight million Americans are classified as overweight, 40 million Americans are considered obese, and 3 million Americans are considered morbidly obese (CDC). In addition, since 1990, there has been a 76% increase in Type II diabetes in adults (CDC). In response, many colleges and universities have switched the focus of their physical education requirements from sport-type elective courses to programs emphasizing lifetime fitness activities. This new emphasis is structured around resistance training, walking or jogging, and other aerobic activities.

Typically, these courses include a classroom component in addition to physical exercise that instructs the students in the benefits of physical activity while simultaneously providing guidelines for physical exercise training. The number of

institutions offering this type of curriculum continues to grow, but little is known about the impact of this type of program on the psychosocial factors and attitudes of students. The main focus for determining the success or failure of a physical exercise training program has been to measure positive changes in physiological variables associated with improvements. There tends to be some change reported in these fitness parameters over the length of the course, but it is unclear whether this type of course has an effect on psychosocial variables (Hurley & Hagberg, 1998).

The Transtheoretical Model has been increasingly used as the theoretical basis for the development of lifestyle behavior intervention strategies including exercise. Prochaska and Velicer (1997) regard behavior change as a process that involves progression through a series of stages: precontemplation, contemplation, preparation, action, and maintenance. Different psycho-behavioral patterns are typical to each of the five stages. These differences may help explain how and why persons move through these stages and what psychological processes or attitudes are impacted by exercise behavioral change (Prochaska & Velicer).

The Transtheoretical Model of Behavior Change (TTM) is an integrative model of behavior change. Key constructs from other theories of psychotherapy and behavioral techniques are integrated, thus the name "Transtheoretical" (Prochaska & Velicer, 1997). In the past decade, there has been increased usage of the TTM in exercise behavior research. The adoption and maintenance of exercise, which was once thought of as an "all or none" event, has been conceptualized as a process or sequences of actions (Dishman, 1994). Experts in the field of exercise are now recommending the application of process models to study exercise and attitudes regarding health.

Self-efficacy is an important component of the TTM (Prochaska & Marcus, 1994). Self-efficacy is a specific belief in one's ability to perform a particular behavior at a certain level (Bandura, 1986). Self-efficacy has been found to increase as a person advances in the stages of change for exercise. For example, several exercise-related studies have suggested that those in the earlier stages of change report the lowest self-efficacy, and those individuals in higher stages, such as the maintenance stage, report the highest self-efficacy (Gorley & Gordon, 1995; Marcus & Owen, 1992).

In addition, personal values have long been considered by social scientists to be significant contributors to attitudes and behaviors. Personal values are statements of the ideal and represent beliefs that particular modes of conduct or end-states of existence are preferable to others (Rokeach, 1973). Over the last several years, researchers have demonstrated relationships between personal values and a large range of attitudes and behaviors. For example, the measurement of personal values, such as health value, has been used in combination with the Transtheoretical Model (Marcus & Simkin, 1993). Proponents of research on personal values posit that people make decisions based on their evaluation of the costs and benefits associated with the decision. Perceptions of benefits and costs related to performing exercise have been shown to vary systematically across the stages of change (Marcus, Simkin, Rossi & Pinto, 1996). Marcus and Owen (1992) found that precontemplators reported more costs than benefits of exercising, while action stage persons reported more benefits than costs to exercising. These findings validate the stages of change model for exercise behavior (Marcus & Owen).

Purpose of the Study

There is a need to identify the factors associated with the adoption and maintenance of exercise behavior. Currently, there is little theoretically-based research or guidance on how to promote the integration of regular exercise into the overall healthcare of young adults (Dijkstra, 2005). These exercise adoption and maintenance challenges are not unique to college populations. Adherence rates to exercise programs for the general public are also problematic (Jones et al., 2001). Numerous scholars who examine individual and interpersonal theoretical models have attempted to explain components associated with exercise behaviors. Individual models include classic learning theories (Skinner, 1938), the health belief model (Rosenstock, 2000), and the Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1983). Interpersonal theories include social cognitive theory (Bandura, Adams, & Beyer, 1977) and the theory of planned behavior (Ajzen, 1990; Ajzen & Fishbein, 1980).

Psychologists have long been interested in the determinants of health-related behavior, especially the beliefs that people hold about their health (Norman, 1995). However, many researchers who study self-efficacy and physical fitness have focused on older adults (McAuley, 1992). There has been little research on self-efficacy for exercise and health value in relation to young adults.

The purpose of this study was to investigate the impact of exercise stage of change and gender on perceived self-efficacy for exercise and health value.

Research Question 1

Does exercise stage of change, gender, or the interaction between them have an effect on health value after controlling for health value before beginning a lifetime fitness course.

Null Hypotheses

1. Exercise stage of change groups and gender groups do not interact to have an impact on health value after controlling for health value before taking a lifetime fitness course.
2. Exercise stage of change groups do not significantly differ on health value after controlling for health value before taking a lifetime fitness course.
3. Gender groups do not significantly differ on health value after controlling for health value before taking a lifetime fitness course.

Research Question 2

Does exercise stage of change and gender or the interaction between them have an effect on perceived self-efficacy for exercise after controlling for self-efficacy for exercise before beginning the lifetime fitness course?

Null Hypotheses

1. Exercise stage of change and gender do not interact to have an impact on self efficacy after controlling for self-efficacy before taking a lifetime fitness course.
2. Exercise stage of change groups do not significantly differ on self-efficacy after controlling for self-efficacy before taking a lifetime fitness course.
3. Gender groups do not significantly differ on self-efficacy after controlling for self-efficacy before taking a lifetime fitness course.

Definition of Terms

The following terms are operationally defined for the purposes of this study:

1. College Level Adults: College students who were 18 years of age and older.
2. Lifetime Fitness Course: An undergraduate lifetime fitness course offered by the Department of Physical Education. The objective of the course was to introduce students to general principles of wellness with the ultimate aim of encouraging positive health attitudes, reinforcing a healthier lifestyle, and helping students make decisions regarding their wellness. This course was offered for 1 hour and 30 minutes three times a week for 15 weeks. Course methodology included lecture, presentation, group discussion, and fieldwork exercises.
3. Self-Efficacy for Exercise: The degree to which individuals believe in their judgment and ability to perform tasks associated with taking a physical fitness course as measured by the Exercise Self-Efficacy Scale (Marcus, Selby, Niaura, & Rossi, 1992).
4. Health Value: The degree to which an individual values health in comparison to other important life values as measured by the Rokeach Values Survey (Rokeach, 1967).
5. Transtheoretical Model of Change Applied to Exercise: According to Prochaska and Velicer (1997), the Transtheoretical Model is a theoretical model of behavior change within a stage framework (precontemplation, contemplation, preparation, action, and maintenance). Specifically, individuals are classified into certain stages based on their readiness to change a behavior (i.e., increase or decrease of

physical activity). The model focuses on the decision-making of the individual and involves emotions, cognitions, and behavior (Prochaska & Velicer).

Assumptions

The following assumptions were made for this study:

1. Participants answered all questions on self-report questionnaires accurately and candidly.
2. Health value and perceived self-efficacy are independent entities related to stage of change.
3. Instruments used for the purpose of the study accurately assess those characteristics they were designed to assess.

Chapter 2

REVIEW OF THE RELATED LITERATURE AND RESEARCH

The literature review provides background for the present study. This review is categorized into the following areas: (a) Transtheoretical Model of Behavioral Change applied to health-related behaviors, (b) self-efficacy and its relationship to health-related behaviors, (c) theoretically based research regarding health value, and (d) gender.

Transtheoretical Model of Behavioral Change

The Transtheoretical Model of Behavioral Change (TTM) (Prochaska & DiClemente, 1996; Prochaska & Marcus 1994; Prochaska & Velicer, 1997) will provide the theoretical framework for this study. The TTM utilizes a stage model and specifically addresses issues of readiness to change, intention to change, and maintaining behaviors (Prochaska & DiClemente, 1983). It was originally developed to explain or predict change in addictive behaviors such as smoking (Prochaska & DiClemente, 1996). Prochaska and DiClemente (1996) believed that their model was appropriate across different change situations. They intended the model to be a general model of change that could provide the theoretical framework for understanding and facilitating behavioral change.

The application of the model for the study of the acquisition of healthy behavior (e.g., exercise) rather than the cessation of an unhealthy behavior (e.g., smoking) has required some modifications of the original TTM. One modification is that the stage of change classification requires different time frames. For example, in smoking cessation, the maintenance period lasts from six months to five years after cessation, while the exercise maintenance stage begins six months after exercise acquisition with no end date. Second, the criterion for success is not always clear-cut in health behaviors. For example, when targeting exercise behavior, there may not be a consensus on what represents success. Third, most health behaviors applications involve the cessation of behaviors rather than the acquisition of behavior. The TTM has offered a useful framework in which to study exercise and other health behaviors.

Increasingly, researchers and practitioners are using the TTM as a theoretical framework for examining health-related behaviors, specifically exercise acquisition and maintenance processes (Cardinal, 1995a). Prochaska and DiClemente (1983) suggest that people progress through various stages when trying to acquire or extinguish a behavior. In the model, the term *stage* refers to the temporal motivational and constancy aspects of change, with at least four stages being proposed for most behaviors. Model testing within health-related behaviors has been carried out using cross-sectional research designs (Cardinal, 1995b). Researchers have demonstrated the degree of association between stage of change for health-related behaviors and other correlates such as physical activity and self-efficacy (Cardinal 1995a).

Various researchers have investigated the use of the TTM to assess change from detrimental health behaviors to healthier behaviors (McAuley & Mihalko, 1998; Sallis et

al., 1986). For example, De Bourdeaudhuij and Sallis (2002) investigated the predictors of both adoption and maintenance of physical activity. The variables of interest included perceived self-control and self-efficacy. A random sample of 1,411 adults participated in this one-year study. The Health Belief Model (Rosenstock, 1990) and the Self-Efficacy for Exercise Scale were administered. Additional questionnaires assessed health and exercise knowledge and self-efficacy.

The Health Belief Model assessed self-report of global activity which included present activity as well as activities of one year ago. Attitudes toward activity were used to assess perceived barriers and motivation to exercise. Exercise efficacy was assessed by four questions rating one's ability to engage in moderate exercise at least twenty minutes three times per week and at least twenty minutes every day. Five percent of the women and 11% of the men endorsed a change from a sedentary lifestyle to the adoption of vigorous activity during the one-year period. No relationship was found between adoption of moderate intensity activity and age. A decline of adoption of vigorous activity was noted with increasing age. Adoption of moderate intensity activities from a sedentary lifestyle was noted in 26% percent of the men and 33% percent of the women. Self-efficacy appeared to be a predictor of maintenance of moderate activity in individuals.

De Bourdeaudhuij and Sallis' (2002) findings support Bandura's theory of self-efficacy. Self-efficacy appears to be a strong predictor of adherence to an exercise program. De Bourdeaudhuij and Sallis' study illustrates that various researchers have investigated the use of the TTM to assess change from detrimental health behaviors to healthier behaviors.

Herrick, Stone, and Mettler (1997) examined scores across five stages of change and across four health behaviors including exercise, protection from sun exposure, smoking, and dietary fat consumption. A total of 760 health behavior questionnaires were sent to the employees at a municipal government worksite. The final sample included 186 participants. Questionnaires assessed demographic information, stage of change, and level of self-efficacy. A 5-point Likert scale was used in the assessment of stage of change and self-efficacy. One question per health behavior was used to identify the subjects' stage of change behavior. Decisional balance questions represented global positives and negatives of the behavior being questioned.

The questions assessing self-efficacy were based upon the level of confidence the subjects had for practicing the specific behavior in a variety of situations. Multivariate analysis of variance (MANOVA) was used to compare the participants' stage of change behavior and decisional balance. Significant main effects were followed up with a one-way analysis of variance (ANOVA) and Tukey's HSD post hoc tests to determine whether there were significant differences between specific stages of change. The participants were compared at each stage across the four health behaviors. Significant differences were found for decisional balance and self-efficacy across the five stages of change, but there was no significant difference between the four health behaviors. Nineteen percent of the participants were in the same stage of change for all four health behaviors. This study provides preliminary evidence that there is considerable stage specificity across multiple health behaviors. Herrick et al. (1997) concluded that employees at each stage of change possess differences in terms of their self-efficacy and recommended that wellness programs focus on stage-specific interventions.

Auld et al. (1998) used the stage of change behavior model to classify dietary behaviors. The authors used the Health Belief Model and Social Learning Theory as the theoretical framework for the development of the questionnaires. The questionnaire, which consisted of 11 items using a 5-point Likert scale, assessed the individual's readiness to reduce dietary fat and increase dietary fiber as advised by the Dietary Guidelines for Americans. The survey was mailed to randomly selected volunteers in 11 states ($n = 3{,}198$) in the United States. Findings indicated that 45% of the volunteers were in the action/maintenance stage for changing fat consumption; 38% for changing fiber consumption; and 35% were in the preparation stage for changing both fat and fiber consumption. The successful classification of the volunteers was attributed to the stage of change behavior algorithm and rigid criteria for the stage of action/maintenance. Action criteria were based upon definitions and descriptors used to allow the volunteers to classify themselves into the appropriate stages. In addition, behavioral indicators were used in the classification process. Findings indicated that individuals can classify themselves into the appropriate stage of behavior. Like dietary change, exercise behavior is complex and changes involved a process of achieving the goal of exercise on a regular basis.

DiClemente et al. (1991) investigated the use of the stage of change model with smokers volunteering for a smoking cessation program. The authors were especially interested in determining the outcome differences in smoking history and prospective cessation activities of the smokers in the stages of precontemplation, contemplation, and preparation over a six-month period. Variables of interest included: (a) stage of change behavior, (b) pretest as measured by the Smoking Abstinence Questionnaire, (c)

perceived stress, (d) physical dependence as measured by the Fagerstrom Tolerance Questionnaire, (e) pros and cons of smoking, and (f) the process of change measured by the Smoking Processes of Change Scale. Participants were recruited through advertisements in Texas and Rhode Island. Participants who volunteered were determined to be in the stages of precontemplation, contemplation, or preparation. Each participant was randomly assigned to one of four smoking intervention groups. Preliminary findings indicated significant mean differences in smoking cessation across the three stages. Individuals in the preparation stage had significantly higher levels of self-efficacy towards smoking cessation than the individuals in the contemplation and precontemplation stages. The findings from this study support the hypothesis that individuals in the stages of precontemplation and contemplation have lower self-efficacy toward smoking cessation than individuals in the preparation stage of change behavior.

The results support the stage categories and stage-specific predictions. All participants were smoking as they volunteered for the study and were classified into stages according to intention to quit and previous cessation activity. Stage classifications (precontemplation, contemplation, preparation, and action) provided strong subgroups of smokers who clearly were at different points in the process of changing their smoking behavior (DiClemente et al., 1991).

Exercise Behavior

Participation in regular exercise is an important component of cardiovascular disease prevention (Powell, Thompson, Capersen, & Kendrick, 1987). Regular exercise can help prevent and treat coronary heart disease, osteoporosis, diabetes, hypertension, and depression (Harris, Caspersen, DeFriese, & Estes, 1989). The benefits of exercise are

clear, but researchers and clinicians are faced with two main challenges: how to get people to initiate physical exercise and how to get active people to maintain their level of activity. According to Burkholder and Nigg (2002), the behavioral processes of change rely on information generated from the environment (i.e., outside the individual) whereas the cognitive processes of change are derived from individual experiences. These processes appear to apply to various health behaviors, including physical activity and exercise (Burkholder & Nigg; Rosen, 2001; Spencer, Pagell, Hallion, & Adams, 2002). Presently, little is known about how to intervene in a population to increase the proportion of individuals interested in adopting regular exercise (Costakis, Dunnagan, & Haynes 1999).

Across a variety of populations, approximately 50% of individuals who join an exercise program will drop out during the first three to six months (Carmody, Senner, Manilow, & Matarazzo, 1980; Dishman, 1994). Although many studies have been conducted to address the problem of exercise relapse, few have addressed exercise adoption or improvements in long-term maintenance of exercise behavior (Dijkstra, 2005; Dishman, Sallis, & Orenstein, 1985). Costakis et al. (1999) suggest that the pattern of exercise relapse is similar to the negatively accelerated relapse curve often seen in addictions. The similarity is of interest, although researchers have yet to document whether common factors or processes are involved in starting a positive behavior such as exercise versus stopping unhealthy behaviors such as smoking (Sonstroem, 1988).

Exercise researchers such as Sonstroem (1988) have recommended that the TTM be applied to exercise behavior as the exercise field shifts from a reliance on predictive models to the use of process models. The promotion of process models such as the TTM

will aid in developing a better understanding of the nature and complexity of exercise behavior change. The adoption and maintenance of exercise behaviors is a complex process which requires a dynamic model, which makes the TTM essential to the study of transitions in the stages of exercise behavior studies (Marcus, Banspach, Selby, Niaura, Rossi, 1992). Some aspects of this model have been applied to exercise (Dishman, 1994).

In addition, several studies were designed to examine the applications of the TTM with regard to exercise behaviors (American College of Sports Medicine, 1991; Marcus, Banspach et al., 1992; Marcus & Owen, 1992). Two key components of the TTM were examined in these studies: exercise stage and the process of change in exercise behavior. The specific aims of these studies were to develop scales that measured both the stages and the processes of exercise behavior change and to determine which processes people were in at different stages of change. It was suggested that these key components of the TTM can be adapted to exercise behavior change (Marcus, Banspach et al.; Marcus & Owen). Further research in this area will provide important insight into how to better address major challenges to the exercise field, such as persuading more people to adopt physical activity and getting adopters to maintain regular physical activity (Marcus & Owen).

One of the major findings in the literature is that both current exercisers and non-exercisers reported three or more major relapses in their lifetime (Cardinal, 1995a; Shephard, 1988; Shephard & Bouchard, 1995). This suggests that cross-sectional surveys provide a very incomplete picture of exercise patterns in the population. National surveys indicate that less than 20% of the of the U.S. adult population are engaging in regular vigorous exercise at any one time (CDC, 2005). This leads health promotion planners to

encourage people to initiate exercise programs on the assumption that most people have never exercised regularly. However, a relatively large proportion of the population, at some point in their lives has participated in a regular exercise program but has not maintained this behavior.

Self-Efficacy

The basic tenet of the Self-Efficacy Theory is that the initiation and persistence of behaviors are determined by individuals' beliefs in their ability to perform the behaviors and their likelihood of success (Bandura, 1977a). Self-efficacy beliefs influence people's choices of goals and goal-directed behavior, expenditure of effort, and persistence in the face of challenges and obstacles (Bandura, 1977b). Judgments of efficacy are specific to certain behaviors and settings. The importance of Self-Efficacy Theory as applied to exercise has been studied by a number of researchers (Marcus, Eaton, Rossi, & Harlow, 1994). For example, Maddux, Brawley, and Boykin (1995) attempted to identify psychosocial variables that are predictors of regimen behaviors in individuals. They looked at aspects of health regimen (diet and exercise) in order to examine whether the predictors generalized across the different regimen behaviors. Expectancy beliefs were found to be the best predictors. The construct of expectancy developed from multiple measures; it was difficult to determine the exact measure that best predicted adherence. In general, Maddux et al. found self-efficacy to be one of the best predictors.

Hurley and Shea (1992) looked at the relationship between self-efficacy and the self-care behaviors of individuals with diabetes in an inpatient care center. Participants were asked to complete the Self-Efficacy Scale and the Self-Care Scale when first admitted, and then again three weeks after discharge. Hurley and Shea found positive

associations between the self-efficacy subscales and the self-care subscales, suggesting that self-efficacy may be a predictor of behavior performance of self-care behaviors. Whether these results are applicable to outpatient individuals is yet to be determined (Hurley & Shea).

Several researchers have supported the relationship between self-efficacy and exercise behavior. Bawel, Keck and Topp (1994) examined factors that might be associated with self-efficacy beliefs in a group exercise class. A positive relationship was found between self-efficacy beliefs and exercise adherence behaviors. Grossman, Brink, and Hauser (1987) studied variations in perceived self-efficacy among adolescents at risk for major health concerns (i.e., obesity, diabetes) using the Self-Efficacy Scale and several other measures to establish their perceived level of control over their health. The results showed that perceived control over health was positively associated with self-efficacy. However, Grossman et al. questioned whether the relationship between efficacy beliefs and health control is caused by another variable and suggested future research in this area.

Lundlow and Grien (1995) stated that differences between health related attitudes and self-efficacy may be due to the use of different health measurement scales or varying research methods and sample differences. In a follow-up study, they examined the relationship between self-care, decisional balance, and self-efficacy. They reported statistically significant findings among the three variables, self-care, self-efficacy, and decisional balance. Individuals who scored higher in carrying out desirable self-care also reported higher levels of self-efficacy. Individuals who reported higher levels of self-

efficacy also reported more positives associated with health behaviors as indicated on the decisional balance scale.

McAuley, Lox, and Duncan (1993) examined the role of personal efficacy in adopting and maintaining an exercise behavior in sedentary older adults over a five-month period. The exercise program involved a low-impact aerobic exercise workout. The volunteers participated in walking or progressive jogging three times per week for at least twenty minutes. Exercise behaviors were assessed for frequency, duration, and intensity level. The exercise program was assessed by the Perceived Physical Ability Measure. A ten-item exercise-specific scale was designed to identify participants' perceived capabilities to exercise three times per week. Physiological variables were also measured. Using a path analysis, self-efficacy proved to be the strongest predictor of subsequent exercise participation. McAuley et al. concluded that the degree to which an individual perceives his or her ability to overcome barriers helps predict frequency. The findings support Bandura's construct. Individuals' perception of the energy required to maintain exercise workouts is related to their general beliefs regarding physical abilities and confidence to continue the exercise program (McAuley et al.).

Participating in an exercise or health program requires individuals to exert energy or acquire mastery in the area (Dishman et al.; 1985; McAuley et al., 1993). Bandura (1986) identified self-efficacy as a common cognitive mechanism mediating behavioral change, signifying a significant relationship between self-efficacy and ability to successfully master various health and exercise-related tasks. The available research appears to support the idea that self-efficacy can influence self-care and other health-related behaviors.

Health Value

The concept of health as a value has been underutilized in health research (Mrus, Sherman, & Anthony, 2006). According to King, Tsevat, and Roberts (2004), one reason that the value of health to an individual has not been measured is the belief that health is so highly valued that there is no reason to assess it. However, Ugland (1989) suggested the relative importance of health and its degree of influence on behavior will vary among individuals.

The extent to which individuals engage in preventive health behaviors may be associated with degree of health value (Ugland, 1989). Due to the preventive nature of obesity regimens, health value may play a role in adherence decisions (Maddux et al., 1995). According to Rokeach (1983), how high or low health ranks among individuals' personal values influences how they will conduct themselves with respect to matters that affect their health. Weiss and Larsen (1996) attempted to clarify the relationship among health locus of control, health value, and health protective behaviors. They found that health value was a stronger predictor than health locus of control in undergraduate students.

Wurtele, Britcher, and Saslawsky (1985) conducted a study to determine whether persuasive health-related communications would affect individuals differently depending on how much they valued their health. They concluded that women who believed that they were vulnerable to osteoporosis intended to adopt the recommended health behaviors regardless of how much they valued health. It was also found that health value scores failed to predict intentions to make health-related behavioral changes. However, the absence of significant findings may have been due to a lack of standardized

measurement devices. According to Mrus et al. (2006), there is no widely accepted method of measuring health value. The value placed on health in general should be considered rather than the value of not having a particular disease.

Much of the health research has focused only on the value of health rather than the value of many potential reinforcements (Wurtele et al., 1988). This can be problematic considering that health values often compete with many other values. A measure of relative health value, in which the value of health was assessed relative to other values, was better able to account for health-related behaviors (King et al., 2004).

According to Modified Social Learning Theory (Wallace, Buckworth, Kirby, & Sherman, 2000; Weiscke, 1993), behavior is a function of self-efficacy, internal health locus of control, and health beliefs. Wallston, Maides, and Wallston (1976) suggested that self-efficacy should only predict health behavior among individuals who value their health and believe that it is under their control. However, Norman (1995) questioned whether the construct of health locus of control should be replaced with behavior-specific efficacy beliefs. Therefore, for individuals to perform a health behavior they would have to value their health, believe the behavior would promote health, and believe they could perform the behavior (King, Taylor, Haskell, & DeBusk, 1993).

Gender

There appears to be very little information in the literature about gender in consideration of stages of change for exercise (McConnaughy, DiClemente & Prochaska, 1989). It is unclear if both women and men proceed similarly through the stages of change processes. The only references to gender other than describing sample characteristics found in the literature was in a study by DiClemente et al. (1991). This

study found no significant gender differences in the distribution of research participants across stages of change for smoking cessation. However, the participants had responded to media advertisements rather than having been self-referred to a smoking cessation group.

Felton, Boyd, Bartoces, and Abbas (2002) examined the main and interaction effects of race, gender, and education on cognitive perceptual factors, health promoting behaviors, problem-solving appraisal, health value, and health definition in a convenience sample of employees aged 21-64 at a state agency. In this study, the participants completed the Personal Lifestyle Questionnaire, the Problem-Solving Inventory, the Health Value Survey, the Health Conception Scale, and a demographic instrument. The results indicated that only gender exerted main effects on health-promoting behaviors, including exercise and relaxation behaviors. The researchers reported that men engaged more frequently in exercise, while women engaged more frequently in relaxation behaviors (e.g., yoga, tai-chi). In addition, Felton et al. (1997) reported a main effect between men and women on health value, reporting that women valued health more than men.

Kristiansen (1990) examined how gender differences in the value of health influence the relationship between gender and health behavior. A secondary analysis was conducted on data from 58 females and 52 males who answered a postal survey by completing the Rokeach Value Survey and measures of the frequency of direct risk and indirect risk (preventive) behaviors. Analyses revealed gender differences in values that were consistent with sex-role norms. Kristiansen reported that females valued health more than males and reported engaging in less direct risk behavior than males. In

addition, a path analysis showed that gender differences in direct risk behavior were mediated by gender differences in the value of health.

It is unclear if there are gender-based differences between exercise and health promotion behaviors (Wallace et al., 2000). Research with regard to health and exercise has not inspired many research studies that include gender (Maddux et al., 1995). Future studies that include gender and participant characteristics, when looking at health and exercise behaviors, would be appropriate especially within the exercise and health promotion areas (O'Leary, 1992).

Summary of Related Research

In summary, the literature regarding patterns and prevalence of exercise adoption among college-age adults demonstrates a gap in the research regarding potential determinants of exercise, attitudes about health, values, and behaviors. The majority of studies that use the TTM focus on extinguishing unhealthy behaviors. Those that have centered on exercise promotion have focused on determinants of exercise. Researchers are aware of the importance of studying attributes associated with exercise in the college-aged population, however; research in this area remains limited. Few researchers have explored factors, such as beliefs and values that could be impacted by exercise.

There is impressive support for the predictive validity of self-efficacy as it applies to exercise behaviors. Self-efficacy has been shown to predict healthy behaviors, but once a healthy behavior has been implemented, self-efficacy has not been extensively explored (Bawel et al., 1994). Few researchers have studied self-efficacy as an outcome measure. It is unclear how exercise behavior might impact self-efficacy when self-efficacy is used

as the outcome variable, and not as the predictor variable. Further research in this area is needed.

At this time, there are few theoretically based studies that address exercise participation and gender. Among the small number of studies that have been done, it has been suggested that gender may be an important factor in exercise behavior. However, few researchers have reported data on the relationship between gender and exercise variables (Ainsworth, 2000).

Americans characterize their lifestyles and physical activity choices by personal values. Gender and or exercise behavior may be important factors that impact self-efficacy and the value of health. However, no researchers have reported data regarding gender, exercise, and the impact these variables might have on self-efficacy or value of health. These insufficiencies in the research present a problem that warrants further study to identify factors that may be impacted by exercise adoption and maintenance. The body of literature would be greatly strengthened by an investigation of potential factors associated with college-aged individuals' participation in exercise.

Chapter 3

METHODOLOGY

Archival Data

Data for the current study were originally collected from students enrolled in a lifetime fitness course. The data set was collected at the beginning of the fall semester during the academic year of 2000-2001 for a study on college students' physiological and attitude changes before, during, and after attending a lifetime fitness course. At the time of data collection, information about demographic characteristics including gender, age, year in school, major, full or part time student status, and employment status was obtained. In addition to these data, three psychosocial variables including exercise stage of change, self-efficacy for exercise, and health value information were assessed. Other data collected included participants' height, weight, body mass index, abdominal skin fold, thigh skinfold, percent of body fat, body density, hand grip strength, flexibility, resting heart rate, systolic blood pressure, run time for 1.5 miles, VO2 max, number of push-ups achieved, and number of sit-ups achieved. All data were collected before the participant began the lifetime fitness course and again at the end of the 15-week course. For the current study, 4 of the original 23 variables were selected: exercise stage of change, gender, self-efficacy for exercise, and health value.

Participants in the Archival Sample

The study took place on the campus of a midsized Midwestern university. Approximately 427 college students were recruited before participating in a lifetime fitness course. Criteria for selection of students to participate in the study included being 18 years or older and being enrolled in the lifetime fitness course. The majority of the sample was Caucasian and perceived their health status as good to excellent.

Participants in the Current Study

One-hundred and ninety participants were randomly extracted from the original data set. According to the comprehensive tables of sample size determination a sample of 150 participants is sufficient to decrease the probability that the test will reject a false hypothesis (type II error) (Cohen, 1988). As a function of missing data, the final data set for each dependent variable included fewer than one-hundred and ninety participants. The self-efficacy for exercise analysis included 184 participants, and the health value analysis included 170 participants.

Procedures

This section consists only of the procedures relevant to the current study and does not discuss the details of the collection of the 23-variable data set. Procedures for gathering data about exercise stage of change, self-efficacy for exercise, health value, and gender will be discussed in detail. College students were recruited at the start of the fall semester in which the lifetime fitness course was offered. The initial meeting lasted approximately 1 hour and 30 minutes. The researchers approached the group of students, provided an introduction to the study and invited them to participate in the study. Those

who volunteered were asked to complete a set of questionnaires to help the researchers conduct a study concerning the effectiveness of the lifetime fitness course.

The researchers stated that they wanted to learn more about how different students benefit from activities in the course and ways to improve the experience and benefits. The researchers explained that in order to conduct the lifetime fitness course evaluation they would like the participants to fill out the same questionnaires at the beginning, middle, and end of the lifetime fitness course. Participants who volunteered were presented with the consent form (see Appendix A). The participants were given time to read and ask questions about the consent form.

To insure the safety of the participants, the researchers used the Physical Activity Readiness Questionnaire or PARQ (Thomas, Reading, & Shepard, 1992) to assess the participants before engaging in the study. This measure was used to screen out students with physical health problems which placed them at risk when participating in a low to moderate intensity level exercise class. Participant responses indicated that they were able to engage in increased physical activity and were in good to excellent health (J. L. Passmore, personal communication, August 12, 2005). No students indicated an inability to participate.

The participants were given the Exercise Stage of Change Questionnaire, Rokeach Value Inventory, and Self-Efficacy for Exercise Scale to complete during the initial contact. They were reminded that the focus of the study was to learn about their attitudes toward exercise. To assess self-efficacy for exercise, individuals needed to have sufficient information about their task (Bandura, 1997a; Bandura et al., 1977). Prior to participating in the study, each participant was asked to purchase an exercise handbook

demonstrating each exercise. Seven weeks (mid-semester) and 15 weeks (end-of the semester) after beginning the fitness course, all participants who had filled out the initial assessments completed the same instruments to measure exercise stage of change, self-efficacy for exercise, and health value. Beginning and end of semester responses were extracted from the archival data set for use in this study.

Instrumentation

Informed Consent

An informed consent was created to invite participants into the study and inform them of their rights when taking part in the research study (see Appendix A). It was assumed that participants who returned the informed consent agreed to take part in the study and understood their rights.

Demographic Questionnaire

A demographic questionnaire was developed to obtain information about participants' gender, age, year in school, major, full or part-time student status, and employment status (see Appendix B). The information was used to describe the sample and help interpret the results.

The Rokeach Values Survey (RVS)

The Rokeach Values Survey ([RVS]; Rokeach, 1967, 1973, 1983) was used to assess personal values. The value set consisted of 10 values that Rokeach described as measuring end-states of existence: happiness, equality, exciting life, freedom, health, self-respect, pleasure, social recognition, accomplishment, and inner harmony. The RVS uses a multidimensional ranking technique to identify personal values and interpret them. This survey frames each item in a perennial present manner and has ten continuous

options without numbers. Ten values are listed in alphabetical order and the participant arranges them in order of importance in their lives. Participants are asked to pick out the one value which is most important to them and write a number "1" to the left of that value. Participants are then asked to pick out the value which is the second most important and write a "2" in the space to the left. Participants continue in the same manner for the remaining values until they have included all of the ten values on the survey. Scoring procedures for the RVS include verifying that all 10 blanks are filled with a number and verifying that each number is used only once in the blanks. All items are numbered between the value of 1 and 10. The value of health is identified by the number indicated next to the value "health" on the Rokeach Values Survey. Lower numbered items indicate a higher value.

The RVS is determined to be a reliable and valid measure of participants' perceptions of values, regardless of gender, and independent of personal values, even controlling for social approval tendencies across a variety of samples (Traub, 1994). A reliability coefficient of .70 has been adequately demonstrated (McCarty & Shrum, 2000).

The multi-item scale provides greater confidence in the results of value assessment when measuring a single value item. Braithwaite and Blamey (2002) judged the RVS to be adequate but noted that it violated approved standards of test and scale construction. Single items and short scales are threats to construct under-representation and construct irrelevant variance (Braithwaite & Blamey).

The Self-Efficacy for Exercise Questionnaire (SEE)

The SEE (McAuley & Mihalko, 1998) is a 13-item survey using a 5-point Likert Scale (1 = *not confident* to 5 = *completely confident*) that focuses on self-efficacy expectations related to the ability to continue exercising in the face of barriers to exercise. A single factor score was created by summing participants' response to the 13 items. Possible scores range from a low of 13 to a high of 65. McAuley (1992) demonstrated good internal consistency for the measure (Cronbach's alpha = .88). Test-retest reliability for the scale over a two-week period was .90. The Kappa index of reliability for the scale over a two-week period was .78. Prior researchers have demonstrated similar evidence of reliability and validity with efficacy expectations significantly correlated with actual participation in an exercise program (McAuley & Mihalko).

The SEE scale was administered using a self-report format to assess exercise self-efficacy. Participants were asked to determine their confidence in completing mild, moderate, and strenuous exercise for 30, 45, and 60 minutes three times per week respectively.

Exercise Stage of Change Questionnaire

The Transtheoretical Model of Behavior Change for Exercise is a 32-item questionnaire specifically designed for exercise (Prochaska, DiClemente, Velicer, & Rossi, 1993; Sonstroem, 1988). This scale was used to assess stages of exercise behavior in the participants. Each item on the scale represents one of the four stages of change for exercise behavior: preparation, contemplation, action, and maintenance. The TTM for exercise may include five stages, but the precontemplation stage is not addressed when participants are being assessed while participating in an exercise program. This

instrument defines regular physical activity as any planned physical exertion aimed at improving or maintaining physical fitness and health, performed at least three times per week for at least 20-30 minutes.

Questionnaire statements are given which represent one of the four stages of change for exercise and the participant is asked to mark the statement that applies to his or her current exercise status. For example, the statement representing the contemplation stage is: "I currently do not engage in physical activity but I am thinking about starting." Participants in the contemplation stage have been thinking about change and intend to change in the next few months (Prochaska & Marcus 1994). For the preparation stage, the statement is, "I currently do engage in some physical activity but not on a regular basis." Participants in the preparation stage intend to take action in the near future, usually the next month. Participants in the preparation exercise stage of change typically have a plan of action and have taken action in the past (Prochaska & Marcus). For the action stage, "I currently do engage in regular physical activity but I have only begun to do so in the last six months." Participants in the action stage have made overt behavioral changes (Prochaska & Marcus). The maintenance stage is represented by, "I currently do engage in regular physical activity and I have done so for longer than six months." The maintenance exercise stage of change includes participants who have made behavioral changes and have maintained those changes for some time (Prochaska & Marcus).

The 32 behavioral and cognitive items are put into an algorithm analysis, a mathematical function that is used to encrypt and decrypt information to determine stage of change for each participant. The algorithm appears to reliably allocate individuals into precontemplation, but for all other stages, its reliability is reported to be only fair

(Dijkstra, 2005). The Kappa index of reliability over a two-week period for the exercise stages of change instrument has been reported as .78 (n = 20). Concurrent validity for this measure has been demonstrated by its significant findings with the Seven Day Recall Physical Activity Questionnaire (Marcus & Simkin, 1993). Construct validity of the exercise stages of change has been supported based on the comparisons of two behavioral variables (structured aerobic exercise, leisure time exercise) two biometrical variables (patterns of stage differences and differences between the extreme stages) and three psychological variables (decisional balance, self-efficacy, cognitive process of change variables) (Cardinal, 1995b). Demographic characteristics have not been shown to predict reliability (Dijkstra).

Qualitative and quantitative research has yielded methodology to evaluate varying levels of stage performance. Correlation coefficients have demonstrated high construct validity (.95), internal consistency (.95), and inter-rater reliability (.99) of the scale. This instrument is thought by some to be reliable and valid for assessing and maintaining behavioral interventions and exercise programs (Schumann, Estabrooks, Nigg, & Hill, 2003). Nevertheless, some stages of change studies have reported contradictory results. Although the Transtheoretical Model inspired much of the empirical work on readiness to change, psychometric researchers have found inconsistent support for the stages of change. Readiness to change may best be conceptualized as a multidimensional and continuous construct with complex relationships to behavior, cognition, and environmental context (Dijkstra, 2005; Schumann et al.).

Chapter 4

RESULTS

Research Design

The research design includes two 2-factor analyses of covariance (ANCOVA) conducted on selected variables from an archival data set. Participants fell into discrete groups (levels of the independent variable) based on characteristics they possessed. These groups were gender and exercise stage of change (contemplation, preparation, action, and maintenance). Participants were compared in two separate analyses with one dependent variable each.

For the purpose of clarity, the first ANCOVA is discussed first followed by a discussion of the second ANCOVA. The first ANCOVA included gender and exercise stage of change as the independent variables, pre-course health value as the covariate, and post-course health value as the dependent variable. The second ANCOVA included gender and exercise stage of change as the independent variable, pre-course self-efficacy for exercise as the covariate and post-course self-efficacy for exercise as the dependent variable.

Data Analysis for Health Value Rankings

An analysis of covariance (ANCOVA) was used to investigate group differences and interactions. The first ANCOVA included pre-course and post-course data obtained from the Rokeach Values Survey. The pre-course data were entered as the covariate, while post-course health value scores constituted the dependent variable. Gender and exercise stage of change (obtained by the demographics sheet and the Exercise Stage of Change Questionnaire) constituted the independent variables.

The ANCOVA was performed to investigate whether gender and exercise stage of change caused significant variance on health value. All of the data were analyzed using the Statistical Package for Social Sciences software (SPSS 11.0 version). The ANCOVA was followed by a post hoc comparison using Bryant Paulson procedures to determine the means that differed among exercise stage of change groups on health value. The Bryant Paulson procedure was used to determine significant differences across stage of change levels.

Null Hypotheses for Health Value Ranking

The results of the first ANCOVA were considered in relationship to the following null hypotheses: (a) Exercise stage of change and gender do not interact to have an impact on health value after controlling for health value before taking a lifetime fitness course; (b) Exercise stage of change groups do not significantly differ on health value after controlling for health value before taking a lifetime fitness course; and (c) Gender groups do not significantly differ on health value after controlling for health value before taking a lifetime fitness course.

Pre-Analysis Data Screening for Health Value Rankings

In order to determine whether the analysis, a two-factor ANCOVA, was still appropriate, a pre-analysis data screening was performed for the first ANCOVA design, focusing on whether ANCOVA assumptions were met by the data. The ANCOVA included exercise stage of change and gender as the independent variables. Health value after participants completed a lifetime fitness course was used as the dependent variable, and health value before participants completed a lifetime fitness course was used as the covariate. A preliminary analysis evaluated the homogeneity-of-slopes assumption. The homogeneity of slopes assumption suggests that the slope between the covariate and the dependent variable for one level of an independent variable was the same as for another level. For example, there was a similar regression coefficient for males when compared to females. The study included two independent variables so a comparison was made between regression slopes across all eight cells of the design. The homogeneity of slopes assumption was affirmed indicating that the relationship between the covariate and the dependent variable did not differ across the independent variable level combinations.

The assumption of independence, which means that scores for each participant are independent of other participants' scores, was met through the procedures and design of the study, as described in the methodology section. The assumption of normality was met by examining skewness in each of the cells, which appeared to be approximately the same and relatively normal in shape. The assumption of homogeneity of variance was tested using Levene's Test of Equality of Error Variances, which tests the hypothesis that the error variance of the dependent variable is equal across groups. The results were not

found to be significant, F (7, 222) = 1.80, p = .122), which means that the assumption of homogeneity of variance was met.

A linear relationship was demonstrated between the covariate, pre-course health value, and the dependent variable, health value scores obtained after completing a lifetime fitness course. The correlation between pre-course health value and post-course health value was significant (r = 0.42, p < .001). Therefore, an Analysis of Covariance (ANCOVA) was required in order to hold the pre-course health value scores constant in the analysis F(7, 162) = 1.662, p < .015.

The Rokeach Values Survey provides a list of values. Participants are given the set of values to evaluate in terms of their importance. Higher ranking of health among the other values represent a higher value for one's health (Rokeach, 1967, 1973, 1983). Participants presented a range of health value rankings from 1-10, with a mean score of 4.8 and a standard deviation of 2.1. A ranking of "1" indicates the highest value when compared to other values. Before beginning a lifetime fitness course, on average, the participants ranked health value higher than more than half of the values listed.

Summary of Results for Health Value Rankings

The ANCOVA was conducted to determine whether there were differences in health value due to the different levels of exercise stage of change and gender. Pre-course scores were controlled for by including them as covariates. Health value was adjusted based on the demonstrated relationship between the covariate (pre-course health value) and the dependent variable (post-course health value). Results of the analysis, which included health value, indicated a significant difference. A significant main effect was yielded by the exercise stage of change variable on health value, F (3, 161) = 5.32, p =

.002. A significant main effect was not found across gender on health value. The interaction was not significant in the analysis. A post hoc comparison using the Bryant Paulson procedure was performed to assess differences across particular stage of change groups on health value. The results of the analysis revealed that participants in the preparation and contemplation exercise stage of change had significantly lower health value than participants in the action and maintenance exercise stage of change. No significant differences were noted between the contemplation and preparation groups. No significant differences were noted between the action and maintenance groups. The results are depicted in Table 1, Table 2, and Table 3, below.

Table 1

Mean Differences on Post-Course Health Value Rankings

Groups compared on Heath Value	*Mean differences*	*t*
Contemplation-preparation	.02	.09
Contemplation-action	1.26	6.98*
Contemplation-maintenance	1.84	9.94*
Preparation-action	1.27	6.98*
Preparation-maintenance	1.86	10.03*
Action-maintenance	1.26	3.37

*$p < .05$

Table 2

Summary of Descriptive Statistics in Relation to Post-Course Health Value Rankings

Stage of Change	Gender	*M*	*SD*	*n*
Contemplation	Female	4.14	1.75	14
	Male	3.75	1.71	12
	Total	3.96	1.71	26
Preparation	Female	3.63	1.60	8
	Male	4.33	2.69	9
	Total	4.00	2.21	17
Action	Female	4.86	2.22	21
	Male	5.75	2.57	32
	Total	5.40	2.45	53
Maintenance	Female	6.38	2.49	39
	Male	5.20	2.89	35
	Total	5.82	2.73	74
Total	Female	5.34	2.44	82
	Male	5.11	2.67	88
	Total	5.22	2.56	170

Table 3

ANCOVA Test of Significance for Post-Course Health Value

Source	*df*	*SS*	Mean Square	*F*	*p*
Pre-Course Health Value	1	35.35	35.35	6.10	.02
Stage of Change For Exercise	3	92.53	30.82	5.32	.00
Gender	1	.83	.83	.14	.71
Stage of Change x Gender	3	38.34	12.78	2.20	.10

$R = .154$ (Adjusted R Squared = .702), $p < .05$

Data Analysis for Self-Efficacy for Exercise

The second ANCOVA included data generated by the Self-Efficacy for Exercise Scale, provided by the self-efficacy for exercise scores. These scores constituted the dependent variable for the second analysis. As was the case in the first ANCOVA, pre-course and post-course data were included in the analysis. Pre-course data on self-efficacy exercise scores, obtained by the Self-Efficacy for Exercise Scale, were used as the covariate. The second ANCOVA included the same independent variables as the first (gender and exercise stage of change) and investigated their effects on participants' self-efficacy for exercise. All of the data were analyzed using the Statistical Package for Social Sciences software (SPSS 11.0 version).

Null Hypotheses for the Self-Efficacy Exercise

The results of the second statistical analyses were considered in relationship to the following null hypotheses: (a) Exercise stage of change and gender do not interact to have an impact on self-efficacy after controlling for self-efficacy before taking a lifetime fitness course; (b) Exercise stage of change groups do not significantly differ on self-efficacy after controlling for self-efficacy before taking a lifetime fitness course; and (c) Gender groups do not significantly differ on self-efficacy after controlling for self-efficacy before taking a lifetime fitness course.

Pre-Analysis Data Screening for the Self-Efficacy for Exercise

A preliminary analysis was included in the second ANCOVA which evaluated the assumptions of this statistical analysis. The homogeneity of regression slopes assumption states that the slope (between the covariate and the dependent variable) for one level of an independent variable is the same as for another level. The regression slopes were

compared across the eight cells of the design on the independent variables, exercise stage of change and gender. This indicated that the relationship between the covariate and the dependent variable did not differ significantly as a function of the independent variables.

The assumption of independence was met through the procedures and design of the study, as described in the methodology section. The assumption of normality was met by examining skewness in each of the cells, which appeared to be approximately the same and relatively normal in shape. The assumption of homogeneity of variance was affirmed using Levene's Test of Equality of Error Variances. The results were not found to be significant $F(7, 162) = 1.80, p = .398$, which means that the assumption of homogeneity of variance was met.

A linear relationship was demonstrated between the covariate, self-efficacy for exercise scores, obtained before the participants' completion of a lifetime fitness course, and the dependent variable, self-efficacy for exercise scores obtained after completing the lifetime fitness course. The correlation between pre-course self-efficacy and post-course self-efficacy was significant ($r = 0.32, p < .001$). Therefore, an Analysis of Covariance (ANCOVA) was required in order to hold the pre-course health value scores constant in the analysis $F(7, 176) = 1.050, p = .012$.

Possible scores on the Self-Efficacy for Exercise Scale range from 13-65. Higher scores represent higher levels of self-efficacy for exercise (McAuley & Mihalko, 1998). Participants presented a range of pre-course self-efficacy scores from 13-65, with a mean score of 46.2 and a standard deviation of 9.9. Therefore, the majority of participants appeared to have above average levels of self-efficacy for exercise.

Summary of Results for Self-Efficacy for Exercise

The second ANCOVA was conducted to determine whether there were differences in self-efficacy for exercise due to the different levels of exercise stage of change and gender. Post-course self-efficacy for exercise scores were adjusted for the analyses. Pre-course scores were controlled for by including them as covariates. Results of the analysis revealed no significant differences for exercise stages of change or gender on self-efficacy for exercise. The interaction was not significant in the analysis. The results are depicted in Table 4 and Table 5.

Table 4

Summary of Descriptive Statistics in Relation to Post-Course Self-Efficacy

Stage of Change	Gender	*M*	*SD*	*n*
Contemplation	Female	45.00	7.80	15
	Male	50.15	10.10	13
	Total	47.39	9.60	28
Preparation	Female	46.64	7.59	11
	Male	49.10	12.20	10
	Total	47.81	9.87	21
Action	Female	47.83	9.01	23
	Male	47.24	9.20	33
	Total	47.48	9.05	56
Maintenance	Female	48.18	9.49	40
	Male	44.59	10.57	39
	Total	46.41	10.13	79
Total	Female	47.36	8.82	89
	Male	46.75	10.39	95
	Total	47.04	9.64	184

Table 5

ANCOVA Test of Significance for Post Course Self-Efficacy

Source	*df*	*SS*	Mean Square	*F*	*p*
Pre-Course Self-Efficacy	1	585.39	583.39	6.45	.01
Stage of Change	3	68.07	22.69	.25	.86
Gender	1	299.73	299.73	.85	.36
Stage of Change x Gender	3	478.89	159.63	.45	.72

$R = .066$ (Adjusted R Squared = .023)

Chapter 5

DISCUSSION

The purpose of this study was to investigate the impact of exercise stage of change and gender on perceived self-efficacy for exercise and health value. The first research question was does exercise stage of change and gender, or the interaction between them, have an effect on health value after controlling for health value before beginning a lifetime fitness course. The second question was does exercise stage of change and gender or the interaction between them have an effect on perceived self-efficacy for exercise after controlling for self-efficacy for exercise before beginning the lifetime fitness course.

Results indicated that only exercise stage of change impacted how participants ranked health value. Regardless of gender, college men and women in the contemplation and preparation exercise stages of change ranked health value lower than those in the action and maintenance exercise stages of change. It was determined that participants in the contemplation and preparation exercise stages were different from participants in the action and maintenance exercise stage of change on health value.

Individuals who reported that they currently do not engage in physical activity but were thinking about starting (contemplation stage) ranked health value lower than individuals who reported recently engaging in regular physical activity (action stage) and

lower than individuals who reported engaging in regular physical activity over the past six months (maintenance stage). Additionally, individuals who reported occasionally engaging in physical activity (preparation stage) ranked health value lower than individuals who reported recently engaging in regular physical activity (action stage) and lower than individuals who reported regularly engaging in physical activity for the past six month or more (maintenance stage).

It is interesting to note that at the lower end of the exercise readiness to change scale individuals who reported thinking about beginning an exercise program (contemplation stage) ranked health value similarly to individuals who reported occasionally engaging in exercise (preparation stage). Likewise, at the higher end of the exercise readiness to change scale individuals who reported recently beginning an exercise program (action stage) ranked health value similarly to individuals who reported engaging in physical activity for the past six months or longer (maintenance stage).

When it comes to self-efficacy for exercise, however, no differences were found in self-efficacy for exercise as a function of exercise stages of change and gender. Men and women across the various stages of change reported similar confidence levels to participate in physical activity.

The current study extends previous research by investigating the impact of exercise stages of change and gender on health value and self-efficacy for exercise among college students. The results are discussed in light of the existing literature. Implications for theory and practice and recommendations for future research are discussed.

Exercise Stage of Change and Health Value

It was theorized that in the context of a lifetime fitness course, differences would be found between exercise stage of change and health value. The results support this hypothesis. As expected, exercise stage of change did impact health value.

A difference was found between exercise stage of change and health value, whereby participant's ranking of health value was highest in the maintenance and lowest in the preparation stage. Participants who reported participating in exercise the most frequently ("I currently do engage in regular physical activity and I have done so for longer than six months") ranked health higher than participants who reported they did not regularly exercise ("I currently do not engage in physical activity but I am thinking about starting"). The results of the current study are consistent with the finding of previous researchers.

Rokeach (1983) suggested that behaviors influence values. According to Rokeach, health-related behaviors such as exercise and frequency and intensity of exercise may affect how high or low health ranks among individuals. King et al. (1993) determined that individuals who perform health related behaviors value their health and believe the behavior will promote health. It was theorized that in the context of a lifetime fitness course participants' identified exercise stage of change would produce a difference on health value. The findings of the current study sustain this assumption. There may be several reasons for this result.

Rokeach (1983) suggests that value of health and behavior influence one another so that behavioral choices affect values. Participants in the action and maintenance exercise stages of change ranked health higher when compared to participants in the

preparation and contemplation exercise stages of change. It may be that people who are ready to put the time and energy into exercise value their health, and that their value of health promotes continual exercise. They continue to exercise because they believe that exercise will promote health.

The results of the current study could also be attributed to the participants' characteristics. For example, the participants in the sample population were young college students and reported being in good to excellent health. This belief may have increased how much the participants valued their health. The participants may have been grateful for their youth and good health which affected their health value. Moreover, it may be that students who exercise regularly (i.e., are in the action or maintenance exercise stage of change) value health highly and choose health-related majors with a requirement to take a lifetime fitness course. Participants who choose to take a lifetime fitness course outside of an academic requirement likely have an interest in, and value, exercise and health. Another option might be that students are encouraged to exercise regularly due to environmental or academic influences, which impacts their health value. College campuses offer multiple opportunities and often encourage students to participant in athletics. Gym memberships are offered at a reduced rate for students, intramural sport participation is encouraged by peers, pick-up basketball, volleyball, and similar activities occur daily on college campuses. The support of athletics and sports on campus may have impacted the amount of daily exercise the participants took part in weekly. The participants may have been participating in regular sport activities, putting them in higher stages of change impacting their value of health.

Approximately half of the individuals who participated in the study were in health related majors. It may be that studying exercise and health can influence how much an individual values his or her health. For example, having knowledge about the various diseases and illnesses and how they can impact level of functioning could influence how much and individual values his or her health. Learning about medications and their side effects, and the thought of having to take medication everyday due to a condition, could influence an individual to appreciate health and value it more.

Furthermore, almost half of the participants fell into either the maintenance or action exercise stage of change. It could be that studying the benefits and preventative nature of exercise could influence one to exercise more thereby increasing health value. Ugland (1989) reported that the extent to which individuals engage in preventive health behaviors is found to be associated with degree of health value. Participants in the maintenance and action stages of exercise reported exercising regularly. It could be that the participants in the maintenance and actions stages were receiving benefits of exercise which affected their value of health.

Marcus and Owen (1992) found that exercise contemplators reported more costs than benefits of exercising, while action stage individuals reported more benefits than costs to exercising. In the current study it is likely that participants in the action and maintenance exercise stages of change perceived health as a benefit of exercise, whereas participants in the contemplation and preparation exercise stages of change indicated that health was not worth the cost of including regular exercise into their daily routines.

The benefits of exercise include physical benefits such as increased strength, endurance, weight loss, and psychological benefits, including increased mood, decreased

stress levels, and increased satisfaction with appearance (King et al. 2004). The benefits of exercising may have influenced the participants to appreciate their bodies' abilities and overall health, especially if they were unhealthy before they began exercising. For example, a person who successfully lost weight and is able to maintain a healthy weight through exercise, is in the action or maintenance stage of change, and likely will value their health more after experiencing what it was like to be overweight (unhealthy). There is a strong possibility that exercise behavior impacts value of health.

The results indicated that no differences were found between the contemplation and preparation exercise stages of change on health value. There might be several reasons for this finding. Participants in the contemplation stage of change intend to change in the next six months (Prochaska & Marcus, 1994). However, it has been reported that people in the contemplation stage may remain in this stage for up to two years before moving into the preparation stage of change (Prochaska & Marcus). Participants in the preparation stage of change intend to change in the next month. The difference between these two stages is the amount of time before the participant is ready to make changes. It is unclear how long the participants who were identified as being in the contemplation stage of change had been in the contemplation stage. It could be that at the time the participants in the contemplation and preparation stages filled out the values survey they were equally prepared to make changes and therefore reported valuing their health similarly.

Gender and Health Value

While it was theorized that participant's gender would impact health value. The results of the current study do not sustain this assumption. No differences between men

and women were found on health value as initially hypothesized. Previous researchers who have studied gender in relation to health values have found mixed results. The literature is limited in this area, which leads to difficulties discussing how the present study supports or discounts previous research. It is unclear if both men and women value health similarly or if there are differences. The lack of difference between men and women on this measure of health value is still worth discussing.

Researchers have indicated that health value appears to be driven by physical symptoms. Physiological symptoms have been found to prompt healthy behaviors such as exercise, which have a direct correlation to an individual's value of health (Fleetwood & Packa, 1991). Gender makes a difference in the kinds of illness that people experience (Ainsworth, 2000). Women are more likely than men to have problems such as obesity, anemia, and respiratory illness (Ainsworth). Not only are women more likely than men to experience chronic, lifelong illness, headaches, and general fatigue, women are more likely to report health related concerns (Furnham & Kirkcaldy, 1997; Stanton et al., 2007). However, in this study, women did not indicate that they valued their health more than men.

The lack of differences between men and women on health value could be attributed to the participant's age. As previously stated, health value has been reported to be driven by physical symptoms which may be associated with age. The participants in the current study were young, college age men and women. It is possible that the participants had few differences in physiological symptoms due to their age. College age adults likely experience fewer physical symptoms when compared to older adults. Older adults are more likely to experience physical discomforts and health problems due to age,

whereby participants in the current study indicated good to excellent health before participation in the study. Perhaps college age men and women are comparatively healthy relative to physiological symptoms, especially when compared to other studies in which gender differences were found among older and middle age individuals. The majority of researchers who have studied health have focused on middle age and older adults. Few studies have investigated health among college age adults, likely under the assumption that young adults do not experience health problems.

Another explanation for the lack of gender differences found on health value could be attributed to environmental and social factors. Many of the participants were in health-related majors and likely had shared interests. This could provide support for the finding that the participants, men and women, were more similar than different when it comes to valuing health. The participants shared majors, related course work, and likely shared similar interests, perhaps including involvement in athletics or exercise which may have impacted value of health.

Exercise Stage of Change and Self-Efficacy

It was hypothesized that, in the context of a lifetime fitness course, participants exercise stage of change would impact self-efficacy. This hypothesis was not confirmed. The importance of Self-Efficacy Theory as applied to exercise has been studied by a number of researchers (Marcus et al., 1994). However what makes this study different is that the current study applied self-efficacy as the outcome variable which has received less attention by social scientists. Many researchers have studied self-efficacy as a predictor variable and have used it to predict exercise and other health-related behaviors. There is impressive support for the predictive validity of self-efficacy as it applies to

exercise and health related behaviors. However, in this study self-efficacy was not used a predictor variable. It could be that self-efficacy is a better predictor variable than an outcome variable, as it has shown success in predicting behaviors. Not many researchers have reported significant differences on self-efficacy once a behavior has been implemented (Bandura, 1997b).

Several exercise-related studies have suggested that those in the earlier stages of change report the lowest self-efficacy, and those individuals in higher stages, such as the maintenance stage, report the highest self-efficacy (Gorley & Gordon, 1995; Marcus & Owen, 1992). The current study did not find a similar result. The lack of difference found between stages of change for exercise on self-efficacy could be attributed to the already high self-efficacy the participants reported before they completed the lifetime fitness course. Participants in the current study indicated above average pre-self-efficacy scores before participating in the lifetime fitness course, which may have left little room for an increase in self-efficacy after participating in the course. The current findings offer support to researchers who indicate no differences when self-efficacy was included as the outcome variable (Bawel et al., 1994).

Maddux et al. (1995) reported that self-efficacy for exercise is a significant predictor of exercise adherence. Although the current study did not use self-efficacy for exercise as a predictor variable, but as the outcome measure, Maddux et al.'s finding can still be loosely associated with the current study. The association between Maddux et al.'s results and those of the current study can only be discussed in theory because no statistical tests were done that would offer direct support for Maddux et al.'s research finding. However, this association is still worth considering. In the current study,

participants identified above average pre-self-efficacy scores and the majority of the participants were in the action and maintenance exercise stages of change. Perhaps, higher levels of self-efficacy for exercise can be associated with exercise adherence as participants in the current study reported above average levels of self-efficacy and exercise adherence (being in the action or maintenance exercise stages of change). Conceivably, self-efficacy could be associated with exercise adherence as Maddux et al. suggested.

Gender and Self-Efficacy

There has been a moderate amount of research done in the area of self-efficacy and gender differences, but few if any researchers have found gender to be significantly associated with self-efficacy. With regard to gender, previous studies have used self-efficacy as a predictor variable. In the current study, it was theorized that in the context of a lifetime fitness course being male or female would impact self-efficacy for exercise. This hypothesis was not supported. Results indicated no differences between males and females on self-efficacy. A possible explanation may be that men and women with regard to self-efficacy are more similar than different. Hyde (2005) reported that men and women are more similar than different along most psychological traits such as introversion, extroversion, and openness to experiences.

Another potential explanation for lack of differences found between gender and self-efficacy could be attributed to pre-existing high levels of self-efficacy. Bandura (1997a) hypothesized that an individual's level of confidence to engage in a specific behavior is significantly related to actual behavior. It could be that regardless of gender, individuals who have confidence in their ability to engage in regular exercise can be seen

as having high self-efficacy for exercise. In the current study, over half of the participants indicated above-average pre-course self-efficacy for exercise scores. These highly self-efficacious men and women can also be expected to feel much more willingness to exercise and to actually engage in a greater amount of regular exercise than individuals with low self-efficacy. Individuals with high levels of self-efficacy for exercise are more likely to participate in exercise which, is evidenced by the majority of participants' falling into the higher exercise stages (action and maintenance stages). This finding supports the idea that participants were already participating in moderate levels of exercise and had above-average self-efficacy for exercise before participating in the lifetime fitness course; which may have prevented major differences from being reported after completing a lifetime fitness course.

In the current study, self-efficacy constituted the outcome variable which has received little attention by previous researchers. It is unclear if differences between men and women have been found when self-efficacy is used as an outcome variable. It is probable that gender similarities and differences are impacted by culture, race, ethnicity, and environmental situations, making it very difficult to confidently and consistently report significant findings related to gender.

Limitations

The current study faced several challenges, one of the largest of which was the use of an archival data set. A concern in working with an archival data set is that it requires the researcher to work backwards in the development of some aspects of the research study. In other words, the research questions were developed from the data set rather than first developing a research question and then collecting the necessary data.

Similarly, the study design revolved around the data set, in this case, eliminating the opportunity to have a control group. The use of archival data also limited the opportunity to gain more or different information from the participants. In addition, the behavioral data were based on self-report instruments and subject to all of the limitations inherent in self-report data (e.g., inaccurate recall and social desirability). The selection of participants was not random, warranting caution as to generalizability of the results.

The data in the current study was collected during the academic school year of 2000-2001. In the past eight years various health promotion changes have taken place with a stronger cultural focus placed on exercise and health. For example, mandatory college physical education classes and insurance benefits for being a gym member are now common. These historical changes may affect the ability to accurately generalize the findings of the current study to present day college students.

Several factors may compromise the conclusions to be drawn from this study. The students in the sample may have several characteristics that suggest a selection bias. Many come from health-related majors. The pre-course results indicated that the students came into the course ranking health value higher in comparison to the other values on the Value Survey (happiness, equality, exciting life, freedom, self-respect, pleasure, social recognition, accomplishment, and inner harmony). It may be that students who choose or are involved in health-related majors or elective courses are already interested in the topic of health and value it more than students who are not involved in health-related courses. A group with more variety with respect to majors and interests may have produced different results.

The study design lacked a control group, which does not allow for any differentiation in effect between selection and true effect. The participants indicated before completing the course that they considered themselves to be in good to excellent health, which may have impacted how they rated health in relation to other values. The population consisted of young adults, which may indicate that in general they have experienced fewer health-related problems or concerns which could impact their self-reported value of health.

Using the ranking procedure of the RVS, previous researchers have demonstrated a reliability coefficient of .70 on the Values Survey (McCarty & Shrum, 2000). The test-retest reliability of the Value Survey appears to be debatable in that many researchers have reported a range of reliability coefficients from .53 to .74 (Braithwaite & Blamey, 2002). Personal values are abstract concepts; evaluating values consistently and confidently appear to be a difficult task as reported by previous researchers.

A main effect was found for exercise stages of change and health value. College age participants in the more advanced exercise stages of change (action and maintenance stages) ranked health value higher than participants in the less advanced exercise stages of change (contemplation and preparation exercise stages). Given the low alpha level ($p > .05$) of many of the findings, the likelihood of these results being attributable to chance is extremely low.

Implications for Theory and Practice

The Stages of Change theory has been studied as it relates to exercise. This model's integration into the social sciences and exercise-related fields has received considerable attention in the last two decades (Schumann et al., 2003). Although the

relationship between exercise stages of change and health value appears to be naturally appealing few empirical efforts have been made in this area (Tia-Seale, 2003). Researchers have focused the majority of their attention on the physical outcomes evidenced by exercise.

The principal purpose of the current study was to investigate the impact of exercise stage of change and gender on self-efficacy for exercise and health value. The results of the current study can provide a framework for health practitioners in both the social science and exercise-related fields. It is imperative that practitioners develop a conceptualization about how exercise behaviors impact health value. An ability to describe important commonalities and differences between the exercise stages of change and health value could be used to help psychologists develop a more comprehensive treatment plan for physical and mental illnesses. Specifically, multiple physical illnesses (e.g., diabetes, high blood pressure, high cholesterol, weight gain) and various mental health concerns (e.g., symptoms of depression, anxiety, eating disorders) have all been reported to be impacted positively by exercise (Harris et al., 1989). Informed treatment planning based on factors impacted by exercise can assist in identification of treatment goals and negative symptom reduction.

Participation in regular exercise is an important component of cardiovascular disease prevention (Powell et al., 1987). Regular exercise can help prevent and treat coronary heart disease, osteoporosis, diabetes, hypertension, and depression (Harris et al., 1989). The benefits of exercise are clear, but researchers and clinicians are faced with two main challenges: how to get people to initiate physical exercise and how to get active people to maintain their level of activity. Knowledge of the characteristics of the

individual's exercise stage of change and competing values can help health professionals identify readiness to change for clients who need to participate in physical activity.

Informed treatment planning based on personal values associated with lack of exercise can help instruct treatment planning and may be especially helpful for psychologists in behavioral medicine settings who develop programs to assist patients in implementing new behaviors or managing unwanted symptoms. For example, if an individual is experiencing mild symptoms of depression and ranks health value low, incorporating an exercise program may be helpful in decreasing depressive symptoms and increasing reported health value. Exercise behavior has been reported to reduce mild to moderate symptoms of depression. Identifying potential set backs in treatment based on readiness to change and values could be helpful in providing more comprehensive effective care.

Results of the current study can be used to increase health professionals' and educators understanding of exercise stage of change and its impact on health value. The current findings provide professionals with information for understanding exercise behavior as it relates to health value among college students. Knowledge of the characteristics of college age participants in context of taking a lifetime fitness course can help professionals identify factors associated with exercise stage of change. Knowledge of an individual's readiness to exercise as it relates to health value may be helpful in identifying level of motivation or readiness to engage in activities; which might be associated with making other positive changes, such as decreasing alcohol consumption or smoking cessation.

The findings of the current study might be particularly helpful to physical educators. A health assessment approach using the Transtheoretical Model might include an assessment of the individual's exercise stage of change, a ranking of his or her value of health, identification of areas of focus, specific needs, preferences, and definition of specific skills to be learned. Knowledge about the individuals current exercise behaviors and value of health could include prescriptive matching between the individual's exercise stage of change, value of health, and an appropriate approach to physical education.

Exercise stage of change and health value can be applied to the theoretical approach of positive psychology, with the focus of treatment on the client's strengths and what the individual can do, rather than what the individual can not do or is not doing. Furthermore, having knowledge about how much an individual values health can be incorporated into strength based counseling and clinical approaches to treatment. An individual's exercise stage of change and ranked value of health can also be tied to multiple areas within a clinical setting. For example, if an individual is doing something damaging to their body (smoking, drug and alcohol use, abusive relationship, risky sexual behavior, suffering from and eating disorder, etc.) the health professional might be able use the individual's readiness to engage in physical activity to increase his or her health value and theoretically decrease the negative health behaviors.

The findings of the current study indicate no differences in ranked health value between the contemplation and preparation exercise stages of change or between the action and maintenance exercise stages of change. Differences were found in health value between the contemplation and action exercise stages of change, contemplation and maintenance exercise stages of change, preparation and action exercise stages of change,

and preparation and maintenance exercise stages of change. This finding suggests that future research should focus on the similarities and differences across the proposed exercise stages of change. It may be that the two higher exercise stages of change (action and maintenance) and the two lower exercise stages of change (contemplation and preparation) are more similar than different. The four current exercise stages of change may not be necessary. Two exercise stages of change may be sufficient. For example, the two stages might be *preparing to implement exercise* behavior and *implementing exercise* behavior. Further research with regard to the exercise stages of change theory is necessary in order to determine if four exercise stages of change are needed or if two exercise stages of change would be more desirable.

Psychologists should have an understanding of how various exercise stages of change impact health value. Presently, little is known about how to intervene in a population to increase health value. It is worth considering the important role of exercise stage of change and its effect on health value. The results of the current study suggest that higher exercise stages of change (i.e., maintenance or action stages) result in health being ranked higher when compared to other personal values (e.g., freedom, equality, pleasure). The findings of the current study suggest that future research should focus on attempts to make more explicit links between exercise (e.g., duration, frequency, type) and health value. It may also be useful to explore other psychological attributes (mood, intelligence, attitudes, etc.) that may be impacted by exercise.

In addition, a surprising finding of this study was that self-efficacy for exercise was not a salient outcome variable. This study may not have adequately captured the unique factors which impact self-efficacy for exercise because the college age

participants indicated above average self-efficacy for exercise before beginning the lifetime fitness course. Research on self-efficacy for exercise has indicated that self-efficacy is a strong predictor variable when used to predict exercise behaviors (e.g., participation and adherence) (McAuley et al., 1993). Few researchers have investigated self-efficacy as an outcome variable as it was used in the present study. It may be that self-efficacy is better at predicting behaviors such as exercise and less meaningful when used as an outcome variable.

Researchers should further investigate the utility of self-efficacy as an outcome variable. Measuring self-efficacy after participants have engaged in a variety of exercise behaviors could lead to further insight into self-efficacy's role in exercise and health.

Recommendations for Future Research

Several factors warrant further study. The following are recommendations that can be considered to guide future research.

1. It is recommended that future researchers use a current sample population and not an archival data set.
2. Future research should focus on attempts to make more explicit links between exercise (e.g. duration, frequency, type) and health value. It may also be useful to explore other psychological attributes (mood, intelligence, attitudes, etc.) that may be impacted by exercise.
3. It is recommended that future researchers explore the reciprocity between exercise behavior and values. Although, the current study investigated exercise stage of change and its impact on health value. It is unknown how health value impacts readiness to change.

4. Specific variables related to health value need to be explored to identify how an individual's history of health impacts health value rankings. Participants' history of physical and mental illness should be investigated. For example, participant's history of drug and substance use, chronic illnesses, dieting behaviors, and participation in exercise may be helpful in specifying variables related to health value.
5. Researchers should further examine the exercise stages of change theory and the differences between exercise stages. It could be that four exercise stages of change are unnecessary and that two exercise stages would be sufficient. For example the two stages might be *preparing to implement exercise* behavior and *implementing exercise* behavior.
6. History of the participants' previous exercise experiences should be explored. For example, participants should be asked about whether they have been in other academic health-related classes with a fitness component or whether they have a history of exercising or taking fitness classes in the community. This information may be helpful in assessing level of commitment to health and exercise.
7. Qualitative studies could be conducted to tap into areas that may affect exercise behaviors and areas that quantitative measures are unable to explore effectively. For example, individual or family history of physical and mental illness, culture, religion, use of alternative medicines (e.g., yoga, tai-chi, meditation), personal beliefs and experiences with exercise, notions about health value, and individuals' sense of self-efficacy for exercise could be examined.

8. Researchers should explore factors that motivate individuals to rank health value highly in comparison to other personal values. For example, researchers could investigate personal beliefs about health, body image concerns, physical and mental health issues, and the impact of health related careers on health value.

Conclusion

The impact of exercise stage of change and gender on health value and self efficacy for exercise was investigated. The current study found that individuals who were thinking about exercising and individuals who were exercising occasionally ranked health lower than individuals who had recently begun an exercise program and individuals who reported exercising for six months or longer. These findings offer preliminary support for the impact of self-reported exercise stage of change on health value rankings among undergraduate college students. However, the experimental design does not allow for generalization of findings to all students. Future comparison group studies would be beneficial. Hopefully, this study will inspire additional investigations of the connections between exercise stages of change and personal values. Research in this area could contribute to knowledge in the area of health, psychology, and fitness by providing more comprehensive and representative information about exercise behavior and its relationship to personal values.

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APPENDIXES

APPENDIX A

Informed Consent

Department of Physical Education

School of Health and Human Performance

Thank you for reading this information. We are conducting a study concerning the effectiveness of this course. As a result of your participation, we hope to learn more about how different students benefit from activities in the course and ways to improve the experience and benefits. In order to conduct this evaluation we would like to use your responses to three, brief questionnaires (at the beginning and end of the course) and information collected on your performance during the course (including quiz grades, general activity level, age, gender, body composition, flexibility, height, weight, skinfolds, resting heart rate, muscular strength, muscular endurance, flexibility, cardiovascular fitness, and resting blood pressure and resting heart rate). This study is being conducted by J. Patrick Babington. Ph.D., J. Laurence Passmore, Ph.D. and Jeremy Brown, B.A.

Before agreeing to take part in the study, please be aware that:

1. Taking part in this study is completely voluntary; it is not a requirement of the class.

2. You have the right to discontinue your participation at any time without penalty. Your responses and information are private and will remain confidential. Your name will be removed from any scores and information, and scores and information will be entered into a computerized database.

3. In this study you will be asked to complete (at the beginning and end of the course) a stage of change questionnaire, a self-efficacy instrument, and a health values inventory. These instruments will be administered during class time and take about 30 minutes to complete.

4. A brief summary of the results of the study will be posted on the bulletin board outside the office of the Department of Physical Education shortly after the beginning of the Fall semester of the 2001-2002 academic year.

If you have any questions or concerns, please contact J. Patrick Babington, Ph.D. at 237-4390.

I, _____, willingly agree to participate in this study.
(Print Name)

_____
(Participant Signature and date)

_____
(Witness Signature and date)

Thank you for participating in this study.

APPENDIX B

Demographic Questionnaire

Age: _____ Gender: ____ (1) Male ____ (2) Female

Is attending ISU your first college experience? ____ Yes ____No

Year in College:

____ (1) Freshman

____ (2) Sophomore

____ (3) Junior

____ (4) Senior

____ (5) Other (Graduate/Unclassified)

Ethnicity:

____ (1) African American

____ (2) Asian American

____ (3) Caucasian

____ (4) Hispanic American

____ (5) Native American

____ (6) Other

Declared Major or Area of Study:

____ (1) Art

____ (2) Business

____ (3) Education

____ (4) English

____ (5) Math

____ (6) Home Economics

____ (7) Life Sciences

____ (8) Social Sciences

____ (9) Speech/Communication

____ (10) Technology

____ (11) Other/Undecided

Was English the first language you learned? ____ (1) Yes ____ (2) No

What is your current enrollment status? ____ (1) Full-time____ (2) Part-time

On a 4.0 scale (estimate if unknown) what is your college cumulative GPA? ____

Current Marital Status:

____ (1) Married/Live together ____ (2) Partnered ____ (3) Single

____ (4) Divorced/Separated ____ (5) Widowed ____ (6) Other

APPENDIX C

Publication Ready Manuscript

Self-Efficacy and Health Value Among Undergraduates Following a Lifetime Fitness Course

Introduction

Psychologists have long been interested in the determinants of health-related behaviors such as exercise and the beliefs that people hold about their health (Norman, 1995). Many researchers who have studied health have focused on physiological components of exercise, failing to recognize the psychological aspects of exercise. Researchers who have investigated psychological components of exercise have focused on middle-aged and older adults and individuals with health problems. Few studies have examined younger, healthier, college age populations and the impact of exercise on their psychological attributes. The literature regarding patterns and prevalence of exercise adoption among college-aged adults indicates a gap in the research regarding potential psychological factors, such as personal values, that are impacted by exercise.

The Transtheoretical Model (TTM) (Prochaska, DiClemente et al., 1993; Sonstroem, 1988) has been increasingly used as the theoretical basis for the development of lifestyle behavior intervention strategies including exercise. This model has been used as an integrative tool to assess processes associated with adopting or extinguishing behaviors. Prochaska and Velicer (1997) regard behavior change as a number of behavioral processes that involve progression through a series of stages: precontemplation, contemplation, preparation, action, and maintenance. Although, the original TTM includes five stages, the precontemplation stage is not included in the TTM

when applied to exercise behavior. When assessing exercise and participants are taking part in an exercise program, it is not necessary to include the precontemplation exercise stage of change. The precontemplation stage includes individuals who are not yet thinking about change or performing the target behavior.

Participants in the contemplation stage of change for exercise report that they have been thinking about exercising and intend to begin exercising in the next few months (Prochaska & Marcus, 1994). Participants in the preparation stage of change for exercise report exercising infrequently but have a plan to begin a regular exercise program in the near future (Prochaska & Marcus). Participants in the action stage report that they have made overt exercise behavioral changes in the past few months (Prochaska & Marcus). The maintenance exercise stage of change includes participants who have made exercise behavioral changes and have maintained those changes for some time (Prochaska & Marcus).

An important component of the Transtheoretical Model is self-efficacy (Prochaska & Marcus, 1994). Self-efficacy is a specific belief in one's ability to perform a particular behavior at a certain level (Bandura, 1986). Self-efficacy has been found to increase as a person advances in the stages of change for exercise. For example, several exercise-related studies have indicated that those in the earlier stages of change report the lowest self-efficacy, while those individuals in higher stages, such as the maintenance stage, report the highest self-efficacy (Gorley & Gordon, 1995; Marcus & Owen, 1992).

Furthermore, personal values have long been considered by social scientists to be significant determinants of attitudes and behaviors. Personal values are statements of the ideal and represent beliefs that particular modes of conduct or end-states of existence are

preferable to others (Rokeach, 1973). Over the last several years, researchers have demonstrated relationships between personal values and a large range of attitudes and behaviors. The extent to which individuals engage in healthy behaviors may be associated with health value (Ugland, 1989).

Theoretical researchers suggest that there may be a combination of personal values that are associated with the type and amount of physical activity in which an individual participates (Rokeach, 1983). The adoption of exercise may impact personal values although few studies have researched these variables at the same time. This gap in the literature represents an opportunity that warrants further study to identify exercise factors that may influence personal values. An investigation of exercise factors associated with college-aged individuals' psychological attributes could provide more comprehensive and representative information about exercise and its impact on values. Due to the preventive nature of exercise regimens, health value may play a role in exercise adherence.

The purpose of the current study was to investigate the impact of exercise stage of change and gender on health value and self-efficacy for exercise. The first research question was does exercise stage of change and gender, or the interaction between them, have an effect on health value after controlling for health value before beginning a lifetime fitness course. The second question was does exercise stage of change and gender, or the interaction between them, have an effect on perceived self-efficacy for exercise after controlling for self-efficacy for exercise before beginning a lifetime fitness course.

Method

Data Collection

Data for the current study were originally collected from students enrolled in a lifetime fitness course. The data set was collected at the beginning of the fall semester during the academic year of 2000-2001 for a study on college students' physiological and attitude changes before, during, and after attending a lifetime fitness course. At the time of data collection, information about demographic characteristics including gender, age, year in school, major, full- or part-time student status, and employment status was obtained. In addition to these data, three psychosocial variables including exercise stage of change, self-efficacy for exercise, and health value were assessed. Four of the original twenty-three variables were selected for this study from an archival data set: exercise stage of change, gender, self-efficacy for exercise, and health value. The variables were selected to investigate the impact of exercise stage of change and gender on self-efficacy for exercise and health value. All data were collected before participants began the lifetime fitness course and again at the end of the 15 week course. Other data collected were not included in the present study and will not be discussed.

Participants

The original study took place on the campus of a midsized Midwestern university. Approximately 427 college students were recruited before participating in a lifetime fitness course. The majority of the sample was Caucasian and perceived their health status as good to excellent. One-hundred and ninety participants were randomly extracted from the original archival data set for examination in the current study. According to the comprehensive tables of sample size determination a sample of 150 participants is

sufficient to decrease the probability that the analysis will reject a false hypothesis (type II error) (Cohen, 1988). As a function of missing data, the final data set for each dependent variable included fewer than one-hundred and ninety participants. The self-efficacy for exercise analysis included 184 participants, and the health value analysis included 170 participants.

Procedures

College students were recruited at the start of the fall semester in which the lifetime fitness course was offered. The researcher approached the group of students, provided an introduction to the study and invited them to participate in the research study. The volunteers were asked to complete a set of questionnaires to help the researchers conduct a study concerning the effectiveness of the lifetime fitness course.

To insure the safety of the participants, the researchers used the Physical Activity Readiness Questionnaire or PARQ (Thomas, Reading, & Shepard, 1992) to assess the participants before engaging in the study. This measure was used to screen out students with physical health problems which placed them at risk when participating in a low to moderate intensity level exercise class. Participant responses indicated that they were able to engage in increased physical activity and were in good to excellent health (J. L. Passmore, personal communication, August 12, 2005). No students indicated an inability to participate.

The participants were given the Exercise Stage of Change Questionnaire, Value Survey, and Self-Efficacy for Exercise Scale. The participants completed the questionnaires during the initial contact and again seven weeks (mid-semester) and fifteen weeks (end-of the semester) after beginning the fitness course. All participants

who had filled out the initial assessments completed the same instruments to measure exercise stage of change, self-efficacy for exercise, and health value. Beginning and end of semester responses were extracted from the archival data set for use in this study.

Instrumentation

Demographic Questionnaire

A Demographic Questionnaire was developed to obtain information about participants' gender, age, year in school, major, full or part time student status, and employment status. The information will be used to describe the sample and help interpret the results.

The Rokeach Values Survey

The Rokeach Values Survey ([RVS] Rokeach, 1967, 1973, 1983) was used to assess personal values. The value set consisted of 10 values that Rokeach described as measuring end-states of existence: happiness, equality, exciting life, freedom, health, self-respect, pleasure, social recognition, accomplishment, and inner harmony. Ten values are listed in alphabetical order and the participant arranges them in order of importance in their lives. Participants are asked to pick out the one value which is most important to them and write a number "1" to the left of that value. Participants are then asked to pick out the value which is the second most important and write a "2" in the space to the left. Participants continue in the same manner for the remaining values until they have included all of the ten values on the survey. The value of health is identified by the number indicated next to the value "health" on the Values Survey. Lower numbered values indicate a higher value. The number "1" rank indicates the highest value and number "10" indicates the lowest value when in comparison to other personal values.

Using the ranking procedure of the RVS, previous researchers have demonstrated a reliability coefficient of .70 on the Values Survey (McCarty & Shrum, 2000).

The Self-Efficacy for Exercise Questionnaire (SEE)

The SEE scale was administered using a self-report format to assess exercise self-efficacy. The SEE (McAuley & Mihalko, 1998) is a 13-item survey on a 5-point Likert scale (1 = *not confident* to 5 = *completely confident*) that focuses on self-efficacy expectations related to the ability to continue exercising in the face of barriers to exercise. Test-retest reliability for the scale over a two-week period was .90. The Kappa index of reliability for the scale over a two-week period was .78 (McAuley & Mihalko). Prior researchers have demonstrated similar evidence of reliability and validity with efficacy expectations significantly correlated with actual participation in an exercise program (McAuley & Mihalko).

Exercise Stage of Change Questionnaire

The Transtheoretical Model of Behavior Change for Exercise is a 32-item questionnaire specifically designed for exercise (Prochaska, DiClemente et al., 1993; Sonstroem, 1988). This scale was used to assess stages of exercise behavior in the participants. The TTM for exercise could include five stages; however when assessing exercise and participants are taking part in an exercise program it is not necessary to include the precontemplation exercise stage of change. The precontemplation stage includes individuals who are not yet thinking about or participating in change. Each item on the scale represents one of the four stages of change for exercise behavior: contemplation, preparation, action and maintenance stages of change for exercise.

Analysis and Results

The research design included two 2-factor analyses of covariance (ANCOVA) to assess the impact of exercise stage of change and gender on self-efficacy for exercise and health value. The first ANCOVA included gender and exercise stage of change as the independent variables, pre-course health value as the covariate, and post-course health value as the dependent variable. The second ANCOVA included gender and exercise stage of change as the independent variable, pre-course self-efficacy for exercise as the covariate and post-course self-efficacy for exercise as the dependent variable. All of the data were analyzed using the Statistical Package for Social Sciences software (SPSS 11.0 version).

Data Analysis for Health Value Rankings

The first ANCOVA included pre-course and post-course data obtained from the Values Survey, as the covariate and the dependent variables, respectively. Gender and exercise stage of change (obtained by the demographics sheet and the Exercise Stage of Change Questionnaire) constituted the independent variables.

The ANCOVA was performed to investigate whether gender and exercise stage of change, or their interaction, caused significant variance on health value rankings. The ANCOVA was followed by a post hoc comparison using Bryant Paulson procedures to determine the means that differed among exercise stage of change groups on health value. The Bryant Paulson procedure was used to determine significant differences in health value rankings across stage of change levels (see Table 1).

Pre-Analysis Data Screening for Health Value Rankings

In order to determine whether the analysis, a two-factor ANCOVA, was appropriate, a pre-analysis data screening was performed for the first ANCOVA design, focusing on whether ANCOVA assumptions were met by the data. A preliminary analysis evaluated the homogeneity-of-slopes assumption. The homogeneity of slopes assumption was affirmed indicating that the relationship between the covariate and the dependent variable did not differ across the independent variable level combinations. The assumption of independence was met through the procedures and design of the study, as described in the methodology section. The assumption of normality was met. The assumption of homogeneity of variance was tested using Levene's Test of Equality of Error Variances. The results were not found to be significant, F (7, 222) = 1.80, p = .122), which means that the assumption of homogeneity of variance was met.

A linear relationship was demonstrated between the covariate, pre-course health value, and the dependent variable, health value scores obtained after completing a lifetime fitness course. The correlation between pre-course health value and post-course health value was significant ($r = 0.42$, $p < .001$). Therefore, an Analysis of Covariance (ANCOVA) was required in order to hold the pre-course health value scores constant in the analysis $F(7, 162) = 1.662$, $p < .015$.

The Values Survey provided a list of values. Participants were given the set of values to evaluate in terms of their importance. Higher ranking of health among the other values represent a higher value for one's health (Rokeach, 1967, 1973, 1983). Participants presented a range of health value rankings from 1-10, with a mean score of 4.8 and a standard deviation of 2.1. A ranking of "1" indicates the highest value when

compared to other values. Before beginning a lifetime fitness course, on average, the participants ranked health higher than more than half of the listed values.

Summary of Results for Health Value Rankings

The ANCOVA was conducted to determine whether there were differences in health value rankings due to the different levels of exercise stage of change and gender. Pre-course scores were controlled for by including them as covariates. Health value was adjusted based on the demonstrated relationship between the covariate (pre-course health value) and the dependent variable (post-course health value). A significant main effect was found for the exercise stage of change variable on health value, $F(3, 161) = 5.32$, $p = .002$. A significant main effect was not found across gender on health value. The interaction was not significant in the analysis. A post hoc comparison using Bryant Paulson procedure was performed to assess differences across particular stage of change groups on health value (see Tables 2 and 3).

The results of the analysis revealed that participants in the contemplation stage of change reported ranking health lower when compared to participants in the action and maintenance stages of change for exercise. Similarly, participants in the preparation stage reported ranking health lower when compared to participants in the action and maintenances stages of change for exercise. No significant differences on health value rankings were noted between the contemplation and preparation groups. No significant differences on health value rankings were noted between the action and maintenance groups.

Data Analysis for Self-Efficacy for Exercise

The second ANCOVA included pre-course and post-course data generated by the Self-Efficacy for Exercise Scale, as the covariate and the dependent variables, respectively. Gender and exercise stage of change (obtained by the demographics sheet and Exercise Stage of Change Questionnaire) constituted the independent variables. The ANCOVA was conducted to investigate whether gender and exercise stage of change, or the interaction, caused a significant variance on self-efficacy for exercise.

Pre-Analysis Data Screening for Self-Efficacy for Exercise

A preliminary analysis was conducted to evaluate the assumptions of this statistical analysis. The regression slopes were compared across the eight cells of the design on the independent variables, exercise stage of change and gender. The relationship between the covariate and the dependent variable did not differ significantly as a function of the independent variables. This means that the homogeneity of slopes assumption was affirmed.

The assumption of independence was met through the procedures and design of the study, as described in the methodology section. The assumption of normality was met. The assumption of homogeneity of variance was affirmed using Levene's Test of Equality of Error Variances. The results were not found to be significant F (7, 162) = 1.80, p = .398, which means that the assumption of homogeneity of variance was met.

A linear relationship was demonstrated between the covariate, self-efficacy for exercise, obtained before the participants' completion of a lifetime fitness course, and the dependent variable, self-efficacy for exercise obtained after completing the lifetime fitness course. The correlation between pre-course self-efficacy and post-course self-

efficacy was significant ($r = 0.32, p < .001$). Therefore, an Analysis of Covariance (ANCOVA) was required in order to hold the pre-course health value scores constant in the analysis $F(7, 176) = 1.050, p = .012$.

Possible scores on the Self-Efficacy for Exercise Scale range from 13-65. Higher scores represent higher levels of self-efficacy for exercise (McAuley & Mihalko, 1998). Participants presented a range of self-efficacy scores from 13-65, with a mean score of 46.2 and a standard deviation of 9.9. Therefore, the majority of participants appeared to have above average levels of self-efficacy for exercise.

Summary of Results for Self-Efficacy for Exercise

The second ANCOVA was conducted to determine whether there were differences in self-efficacy for exercise due to the different levels of exercise stage of change and gender. Post-course self-efficacy for exercise scores were adjusted for the analyses. Pre-course scores were controlled for by including them as covariates. Results of the analysis revealed no significant differences for exercise stages of change or gender on self-efficacy for exercise. The interaction was not significant in the analysis (see Tables 4 and 5).

Discussion

The purpose of this study was to investigate the impact of exercise stage of change and gender on perceived self-efficacy for exercise and health value. Results indicated that only exercise stage of change impacted how participants ranked health within a set of competing values. Regardless of gender, college men and women in the contemplation and preparation exercise stages of change ranked health lower than those in the action and maintenance exercise stages of change. It was determined that

participants in the contemplation and preparation exercise stages were different from participants in the action and maintenance exercise stage of change on health value.

Individuals who reported that they currently do not engage in physical activity but were thinking about starting (contemplation stage) ranked health lower than individuals who reported recently engaging in regular physical activity (action stage) and lower than individuals who reported engaging in regular physical activity over the past six months (maintenance stage). Additionally, individuals who reported occasionally engaging in physical activity (preparation stage) ranked health value lower than individuals who reported recently engaging in regular physical activity (action stage) and lower than individuals who reported regularly engaging in physical activity for the past six month or more (maintenance stage).

It is interesting to note that at the lower end of the exercise readiness to change scale individuals who reported thinking about beginning an exercise program (contemplation stage) ranked health value similarly to individuals who reported occasionally engaging in exercise (preparation stage). Likewise, at the higher end of the exercise readiness to change scale individuals who reported recently beginning an exercise program (action stage) ranked health value similarly to individuals who reported engaging in physical activity for the past six months or longer (maintenance stage).

Regarding self-efficacy for exercise, however, no differences were found in self-efficacy for exercise as a function of exercise stages of change and gender. Men and women across the various stages of change reported similar confidence levels to participate in physical activity.

The current study extends previous research by investigating the impact of exercise stages of change and gender on health value and self-efficacy for exercise among college students. The results will be discussed in light of the existing literature. Implications for theory and practice and recommendations for future research are discussed.

Exercise Stage of Change and Health Value

It was theorized that in the context of a lifetime fitness course, differences would be found between exercise stage of change and health value. The results support this hypothesis. As expected, exercise stage of change did impact health value. Participants' ranking of health among competing values was highest in the maintenance and lowest in the preparation stage. The results of the current study are consistent with the findings of previous researchers.

Rokeach (1983) suggests that value of health and behavior influence one another so that behavioral choices affect values. Participants in the action and maintenance exercise stages of change ranked health higher when compared to participants in the preparation and contemplation exercise stages of change. It may be that people who are ready to put the time and energy into exercise value their health, and that their value of health promotes continual exercise. They continue to exercise because they believe that exercise will promote health.

The results of the current study could also be attributed to the participants' characteristics. For example, the participants in the sample population were young college students and reported being in good to excellent health. This belief may have increased how much the participants valued their health. It may be that students who

exercise regularly (i.e., are in the action or maintenance exercise stage of change) value health highly and choose health-related majors with a requirement to take a lifetime fitness course. Another option might be that students are encouraged to exercise regularly due to environmental or academic influences, which impacts their health value. College campuses offer multiple opportunities and often encourage students to participant in athletics. The support of athletics and sports on campus may have impacted the amount of daily exercise the participants participated in weekly. The participants may have been taking part in regular sport activities, putting them in higher stages of change impacting their value of health.

Approximately half of the participants who took part in the study were in health related majors. It may be that studying exercise and health can influence how much an individual values his or her health. For example, having knowledge about the various diseases and illnesses and how they can impact level of functioning could influence how much an individual values his or her health.

The results indicted that no differences were found between the contemplation and preparation exercise stages of change on health value. There might be several reasons for this finding. Participants in the contemplation stage of change intend to change in the next six months (Prochaska & Marcus 1994). However, it has been reported that people in the contemplation stage may remain in this stage for up to two years before moving into the preparation stage of change (Prochaska & Marcus 1994). Participants in the preparation stage of change intend to change in the next month. The difference between these two stages is the amount of time before the participant is ready to make changes. It is unclear how long the participants who were identified as being in the contemplation

stage of change had been in the contemplation stage. It could be that at the time the participants in the contemplation and preparation stages filled out the values survey they were equally prepared to make changes and therefore reported valuing their health similarly.

Gender and Health Value

While it was theorized that participant's gender would impact health value. The results of the current study do not sustain this assumption. No differences between men and women were found on health value as initially hypothesized.

Researchers have indicated that health value appears to be driven by physical symptoms. Physiological symptoms have been found to prompt healthy behaviors such as exercise, which have a direct correlation to an individual's value of health (Fleetwood & Packa, 1991). Gender makes a difference in the kinds of illness that people experience (Ainsworth, 2000). Women are more likely than men to experience chronic, lifelong illness, headaches, and general fatigue and they are more likely to report health related concerns (Rosenstock, 2000). Therefore, it was expected that women would rank health value higher based on prior experiences of being unhealthy. However, in this study, women did not indicate that they valued their health more than men.

The lack of differences between men and women on health value could be attributed to the participants' age. Health value has been reported to be driven by physical symptoms which may be associated with age. The participants in the current study were young college age men and women. It is possible that the participants had few differences in physiological symptoms due to their age. College age adults likely experience fewer physical symptoms when compared to older adults. Perhaps college age men and women

are comparatively healthy relative to physiological symptoms, especially when compared to other studies in which gender differences were found among older and middle age individuals.

Exercise Stage of Change and Self-Efficacy

It was hypothesized that, in the context of a lifetime fitness course, participants exercise stage of change would impact self-efficacy. This hypothesis was not confirmed. The lack of difference found in self-efficacy as a function of exercise stages of change could be attributed to the already high self-efficacy the participants reported before they completed the lifetime fitness course. Participants in the current study indicated above average self-efficacy scores before participating in the lifetime fitness course, which may have left little room for an increase in self-efficacy after participating in the course. The current findings offer support to researchers who indicate no differences when self-efficacy was included as the outcome variable.

Gender and Self-Efficacy

There has been a moderate amount of research done in the area of self-efficacy and gender differences but few if any researchers have found gender to be significantly associated with self-efficacy. With regard to gender, previous studies have used self-efficacy as a predictor variable. In the current study, it was theorized that in the context of a lifetime fitness course being male or female would impact self-efficacy for exercise. This hypothesis was not supported. Results indicated no differences between males and females on self-efficacy. A possible explanation may be that men and women with regard to self-efficacy are more similar than different. Hyde (2005) reported that men and

women are more similar than different along most psychological traits (e.g., introversion, extroversion, openness to experiences).

Another potential explanation for lack of differences found between gender and self-efficacy could be attributed to pre-existing high levels of self-efficacy. It could be that regardless of gender, individuals who have confidence in their ability to engage in regular exercise can be seen as having high self-efficacy for exercise. In the current study, over half of the participants indicated above-average pre-course self-efficacy for exercise scores. These highly self-efficacious men and women can also be expected to feel much more willingness to exercise and to actually engage in a greater amount of regular exercise than individuals with low self-efficacy. Individuals with high levels of self-efficacy for exercise are more likely to participate in exercise which is evidenced by the majority of participants falling into the higher exercise stages (action and maintenance stages). This finding supports the idea that participants were already participating in moderate levels of exercise and had above-average self-efficacy for exercise before participating in the lifetime fitness course; which may have prevented major differences from being reported after completing a lifetime fitness course.

Limitations

The current study faced several challenges, one of the largest of which was the use of an archival data set. A concern in working with an archival data set is that it requires the researcher to work backwards in the development of some aspects of the research study. In other words, the research questions were developed from the data set rather than first developing a research question and then collecting the necessary data. Similarly, the study design revolved around the data set, in this case, eliminating the

opportunity to have a control group. The use of archival data also limited the opportunity to gain more or different information from the participants. In addition, the behavioral data were based on self-report instruments and subject to the limitations inherent in self-report data (e.g., inaccurate recall and social desirability). The selection of participants was not random, warranting caution as to generalizability of the results.

Several factors may compromise the conclusions to be drawn from this study. The students in the sample may have several characteristics that suggest a selection bias. Many come from health-related majors. Furthermore, before beginning a lifetime fitness course, on average, the participants ranked health value higher than more than half of the values listed on the Values Survey (happiness, equality, exciting life, freedom, self-respect, pleasure, social recognition, accomplishment, and inner harmony). It may be that students who choose or are involved in health-related majors or elective courses are already interested in the topic of health and value it more than students who are not involved in health-related courses. A group with more variety with respect to majors and interests may have produced different results.

The study design lacked a control group, which does not allow for any differentiation in effect between selection and true effect. The participants indicated before completing the course that they considered themselves to be in good to excellent health, which may have impacted how they rated health in relation to other values. The population consisted of young adults, which may indicate that in general they have experienced fewer health-related problems or concerns which could impact their self-reported value of health.

Implications for Theory and Practice

The Stages of Change theory has been studied as it relates to exercise. This model's integration into the social sciences and exercise-related fields has received considerable attention in the last two decades (Schumann, Estabrooks, Nigg, & Hill, (2003). Although the relationship between exercise stages of change and health value appears to be naturally appealing few empirical efforts have been made in this area (Tia-Seale, 2003). Researchers have focused the majority of their attention on the physical outcomes evidenced by exercise.

The principal purpose of the current study was to investigate the impact of exercise stage of change and gender on self-efficacy for exercise and health value. The results of the current study can provide a framework for health practitioners in both the social science and exercise-related fields. It is imperative that practitioners develop a conceptualization about how exercise behaviors impact health value. An ability to describe important commonalities and differences between the exercise stages of change and health value could be used to help psychologists develop a more comprehensive treatment plan for physical and mental illnesses. Specifically, multiple physical illnesses (e.g., diabetes, high blood pressure, high cholesterol, weight gain) and various mental health concerns (e.g., symptoms of depression, anxiety, eating disorders) have all been reported to be impacted positively by exercise (Harris, Caspersen, DeFriese, & Estes, 1989). Informed treatment planning based on factors impacted by exercise can assist in identification of treatment goals and negative symptom reduction.

Participation in regular exercise is an important component of cardiovascular disease prevention (Harris et al., 1989). Regular exercise can help prevent and treat

coronary heart disease, osteoporosis, diabetes, hypertension, and depression (Harris, et al.). The benefits of exercise are clear, but researchers and clinicians are faced with two main challenges: how to get people to initiate physical exercise and how to get active people to maintain their level of activity. Knowledge of the characteristics of the individual's exercise stage of change and competing values can help health professionals identify readiness to change for clients who need to participate in physical activity.

Informed treatment planning based on personal values associated with lack of exercise can help instruct treatment planning and may be especially helpful for psychologists in behavioral medicine settings who develop programs to assist patients in implementing new behaviors or managing unwanted symptoms. For example, if an individual is experiencing mild symptoms of depression and ranks health value low, incorporating an exercise program may be helpful in decreasing depressive symptoms and increasing reported health value.

The findings of the current study might be particularly helpful to physical educators. A health assessment approach using the Transtheoretical Model might include an assessment of the individual's exercise stage of change, a ranking of his or her value of health, identification of areas of focus, specific needs, preferences, and definition of specific skills to be learned. Knowledge about the individual's current exercise behaviors and value of health could include prescriptive matching between the individual's exercise stage of change, value of health, and an appropriate approach to physical education.

The findings of the current study indicate no differences in ranked health value between the contemplation and preparation exercise stages of change or between the action and maintenance exercise stages of change. Differences were found in health value

between the contemplation and action exercise stages of change, contemplation and maintenance exercise stages of change, preparation and action exercise stages of change, and the preparation and maintenance exercise stages of change. This finding suggests that future research should focus on the similarities and differences across the proposed exercise stages of change. It may be that the two higher exercise stages of change (action and maintenance) and the two lower exercise stages of change (contemplation and preparation) are more similar than different. The four current exercise stages of change may not be necessary. Two exercise stages of change may be sufficient. For example, the two stages might be *preparing to implement* exercise behavior and *implementing exercise* behavior. Further research with regard to the exercise stages of change theory is necessary in order to determine if four exercise stages of change are needed or if two exercise stages of change would be more desirable.

In addition, a surprising finding of this study was that self-efficacy for exercise was not a salient outcome variable. Researchers should further investigate the utility of self-efficacy as an outcome variable. Measuring self-efficacy after participants have engaged in a variety of exercise behaviors could lead to further insight into self-efficacy's role in exercise and health.

Recommendations for Future Research

It is recommended that future researchers use a current sample population, rather than an archival data set, to allow more flexibility in the selection of variables. Future research should focus on attempts to make more explicit links between exercise (e.g., duration, frequency, type) and health value. It may also be useful to explore other psychological attributes (mood, intelligence, attitudes, etc.) that may be impacted by

exercise. In addition, it is recommended that future researchers explore the reciprocity between exercise behavior and values. The current study investigated exercise stage of change and its impact on health value; it is unknown how health value impacts readiness to change.

Specific variables related to health value need to be explored to identify how an individual's history of health impacts health value rankings. Participants' history of physical and mental illness should be investigated. For example, a participant's history of drug and substance use, chronic illnesses, dieting behaviors, and participation in exercise may be helpful in specifying variables related to health value. A history of the participants' previous exercise experiences could be explored. Participants could be asked about whether they have been in other academic health-related classes with an exercise component or whether they have a history of exercising or taking fitness-related classes in the community. This information may be helpful in assessing level of commitment to health and exercise.

Also, qualitative studies could be conducted to tap into areas that may affect exercise behavior and that quantitative measures are unable to explore effectively. For instance, individual or family history of physical and mental illness, culture, religion, use of alternative medicines (e.g., yoga, tai-chi, meditation), personal beliefs about and experiences with exercise, notions about health value, and individuals' sense of self-efficacy for exercise could be examined. Qualitative methods could also allow researchers to explore in depth factors that motivate individuals to rank health highly in comparison to other personal values. Such factors might include personal beliefs about

health, body image concerns, physical and mental health issues, and the impact of health related careers on health value.

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Table 1

Mean Differences on Post-Course Health Value Rankings

Groups compared on Heath Value	*Mean differences*	*t*
Contemplation-preparation	.02	.09
Contemplation-action	1.26	6.98*
Contemplation-maintenance	1.84	9.94*
Preparation-action	1.27	6.98*
Preparation-maintenance	1.86	10.03*
Action-maintenance	1.26	3.37

*$p < .05$

Table 2

Summary of Descriptive Statistics in Relation to Post-Course Health Value Rankings

Stage of Change	Gender	*M*	*SD*	*n*
Contemplation	Female	4.14	1.75	14
	Male	3.75	1.71	12
	Total	3.96	1.71	26
Preparation	Female	3.63	1.60	8
	Male	4.33	2.69	9
	Total	4.00	2.21	17
Action	Female	4.86	2.22	21
	Male	5.75	2.57	32
	Total	5.40	2.45	53
Maintenance	Female	6.38	2.49	39
	Male	5.20	2.89	35
	Total	5.82	2.73	74
Total	Female	5.34	2.44	82
	Male	5.11	2.67	88
	Total	5.22	2.56	170

Table 3

ANCOVA Test of Significance for Post-Course Health Value

Source	*df*	*SS*	Mean Square	*F*	*p*
Pre-Course Health Value	1	35.35	35.35	6.10	.02
Stage of Change For Exercise	3	92.53	30.82	5.32	.00
Gender	1	.83	.83	.14	.71
Stage of Change x Gender	3	38.34	12.78	2.20	.10

$R = .154$ (Adjusted R Squared = .702), $p < .05$

Table 4

Summary of Descriptive Statistics in Relation to Post-Course Self-Efficacy

Stage of Change	Gender	*M*	*SD*	*n*
Contemplation	Female	45.00	7.80	15
	Male	50.15	10.10	13
	Total	47.39	9.60	28
Preparation	Female	46.64	7.59	11
	Male	49.10	12.20	10
	Total	47.81	9.87	21
Action	Female	47.83	9.01	23
	Male	47.24	9.20	33
	Total	47.48	9.05	56
Maintenance	Female	48.18	9.49	40
	Male	44.59	10.57	39
	Total	46.41	10.13	79
Total	Female	47.36	8.82	89
	Male	46.75	10.39	95
	Total	47.04	9.64	184

Table 5

ANCOVA Test of Significance for Post Course Self-Efficacy

Source	*df*	*SS*	Mean Square	*F*	*p*
Pre-Course Self-Efficacy	1	585.39	583.39	6.45	.01
Stage of Change	3	68.07	22.69	.25	.86
Gender	1	299.73	299.73	.85	.36
Stage of Change x Gender	3	478.89	159.63	.45	.72

R = .066 (Adjusted R Squared = .023)