Analysis of one structured fitness motivation intervention on self-efficacy, achievement goal orientations and exercise adherence in sedentary and moderately active adults

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ANALYSIS OF ONE STRUCTURED FITNESS MOTIVATION INTERVENTION ON SELF-EFFICACY, ACHIEVEMENT GOAL ORIENTATIONS AND EXERCISE ADHERENCE IN SEDENTARY AND MODERATELY ACTIVE ADULTS

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Analysis of One Structured Fitness Motivation Intervention on
Self-Efficacy, Achievement Goal Orientations and Exercise
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ABSTRACT

Analysis of One Structured Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations and Exercise Adherence in Sedentary and Moderately Active Adults

by

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Currently, many Americans spend extended periods of time in sedentary activities, potentially contributing to a variety of health concerns such as obesity and the onset of many chronic diseases. Given this widespread societal challenge, and using intact university undergraduates as a study sample, this dissertation research first provided descriptive information concerning psychological characteristics of physical appearance self-efficacy and goal orientation as potentially correlated with exercise adherence behavior. A second purpose of this research examined how known effective behavior analytic interventions of instructor-set goals/modeling, public posting, and peer-feedback might affect the research sample’s exercise adherence behavior, and might affect linked psychological determinants of self-efficacy and goal orientation. The dissertation research was conducted in a modern, well-equipped exercise and fitness facility located
at a metropolitan Midwest university, using three introductory structured exercise and fitness classes of with a total of 51 participants across the three experimental classes. Two university physical activity classes were exposed to a simple repeated measures reversal design (ABACADA and ABADACA) across classes and across participants to determine the relative effectiveness of three instructional strategies (i.e., instructor-set goals, public posting, peer-feedback) on increasing exercise adherence, changing physical appearance self-efficacy levels, and alterations in primary achievement goal orientation. The third intact physical activity class was used as a control comparison group and only received the instructor-set goals/modeling intervention. Adherence measures included class attendance and the amount of active participation during class time (i.e., number of sets completed per exercise session). Psychological measures were gathered using respective Self Efficacy Scale for Physical Appearance (SEPA) and Achievement Goal Orientation Scale for Physical Activity survey instruments. Results of Study I indicated that the correlation data among physical appearance self-efficacy, goal orientation, and exercise participation were not statistically significant (p<.05). The findings of the behavior analyses contained in Study II showed that public posting and peer-feedback were effective in reducing absenteeism and increasing participant effort levels. However, the public posting treatment was found to be generally superior to the peer-feedback treatment. Interestingly, the goal-setting treatment did not significantly influence class attendance or participant effort levels compared to the other treatments, though this pedagogical method is most widespread in contemporary settings of the type this dissertation research used. Implications are last provided in recommending additional
study of the as yet unknown functionally related variables that may impact in important ways the tendency to participate and adhere to structured exercise regimens.
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CHAPTER 1

INTRODUCTION

A wealth of research has confirmed that regular physical activity is one of the most important physical quality of life factors in relation to the prevention of a number of chronic diseases including diabetes, cardiovascular disease, metabolic disturbances, obesity, hypertension and certain types of cancers (Bouchard & Despres, 1995; Epstein, 1998). Regular exercise participation has also been linked in positive ways to psychological well-being. Correlations have been documented in the reduction of symptoms related to mild to moderate depression, anxiety, stress, and in the increase of general feelings of psychological well-being (Babyak, Blumenthal, Herman, Khatri, Doraiswamy, Moore, Craighead, Baldewicz, & Krishnan, 2000, Biddle, 1995; North, McCallaugh, & Tran, 1990; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). Contrary to recommendations for the lifespan population to increase the amount and intensity of regular physical activity, more and more Americans are spending extended periods of time in sedentary activities (e.g., watching television, playing computer games, etc.), in turn increasing the risk of obesity and the development and onset of chronic diseases associated with lack of regular physical activity (Epstein, 1998; Salmon, Bauman, Crawford, Timperio, & Owen, 2000). The alarming trend of chronic disease increases each passing year in the sedentary behaviors of the general population. This trend has led many researchers in the exercise science, public health, and sports
psychology fields to examine why many Americans do not tend toward regular participation in physical activity or adhere to any sort of regular exercise program or regimen. In fact, statistics frequenting the popular media show that approximately 60% of Americans are not meeting the recommended amount of physical activity for optimum health (Dishman, 1994). In addition, current research suggests that about 50% of the individuals who begin a structured exercise program with regularly scheduled meeting times quit within three to six months (Dishman, 1988).

An important and impacting set of questions that remain largely unanswered from an empirical perspective, therefore, include ones of: why do individuals tend to be largely nonparticipatory in regular physical activity, and when enrolling in a structured physical activity program why do individuals tend to drop out and not adhere to those programs? Many potential motivational, psychological, and situational variables may play a functional part in answer to these questions. In specific, literatures in the areas of self-efficacy for physical appearance and goal orientation may provide guidance in relation to structured physical activity participation and adherence behaviors. This dissertation, therefore, focuses on exploration from an empirical stance of these questions. In this way, a scientific data base facilitative of encouraging greater participation and long term adherence to structured physical activity programs may be provided. A first objective of this dissertation, therefore, was designed to investigate how psychological determinants such as self-efficacy for physical appearance and goal orientation may be linked to exercise adherence behavior. A second objective was organized to examine how known effective behavior analytic interventions (e.g., public posting, peer instruction, etc.) might
effect linked psychological determinants, and might alter in functional ways exercise adherence behavior.

The Importance of Physical Activity

Regular participation in physical activity, whether in a structured class type setting or one's own, has been documented to have a number of physiological and psychological benefits that enhance health and extend life (Hagberg et. al., 1994). With regard to physiological effects, physical activity is supported as a key factor in reducing the prevalence of obesity and a host of metabolic conditions associated with being overweight (Wei, Gibbons, Kampert, Nichamen, & Blair, 2000). Regular participation has also been linked as a protective factor against several major chronic diseases such as atherosclerosis, hypertension, and stroke (Bandura, 1997). In addition, physical activity participation has been shown to lead to a strengthening of the musculoskeletal system by improving muscle and joint function (Corbin & Pangrazi, 1993). This benefit is a key factor in maintaining functional locomotive capacity as one ages, and therefore facilitates relative lifespan independence. At issue, is that regular participation in physical activity may be one of the most effective disease prevention and quality of life improvement interventions at our disposal, both in terms of improving general physiological health and in terms of slowing the aging process (Bouchard, Shepard, & Stephens, 1994; Fielding, 1995; Morganti, Nelson, Fiatarone, Dallal, Economos, Crawford, & Evans, 1995)

Related to this dissertation research, regular engagement in structured physical activity has been linked to the improvement of emotional state, particularly in relation to measures of anxiety and stress (Tuscon & Sinyor, 1993). In this line of research it has been hypothesized, though much experimentation remains to a thoroughgoing science of
exercise intervention, that individuals who are physically fit may be more adept at controlling and regulating physiological responses to stressors and recover more quickly from stressful and anxious events than those with low physical fitness levels (Holmes, 1993).

The Challenges of Activity Adherence

As stipulated in this dissertation's opening statements, despite the wealth of documentation in support of the physiological and psychological benefits of engagement in regular physical activity, the majority percentage of Americans in most age groupings do not exercise on a regular basis. Additionally, those who begin an exercise routine or enroll in a structured physical activity program often quit within a short period of time (Dishman, 1988). Clearly, the reasons why individuals choose not to participate in an exercise program is an important topic for professionals and researchers in the medical, psychological, and exercise professions due to the many documented and hypothesized connections between regular engagement in physical activity and a range of physiological and psychological factors (Craft & Landers, 1998, United States Department of Health and Human Services, 2000).

Traditionally, many researchers interested in exercise participation and exercise program adherence have used personal strategies that target individuals or small groups for analysis (Winett, King, & Altman, 1989). This approach has focused on some of the biological, cognitive, and behavioral variables that may influence physical activity behavior patterns. Within this general scientific approach, some models of behavior change have been borrowed to attempt theoretical description including social learning (Bandura, 1986), self-motivation (Merkle, Jackson, Zhang, & Dishman, 2002), and
health-belief models (Slenker, Price, Roberts, & Jurs, 1984). Application of these models of behavior change have provided some insight into the potential variables that may either functionally inhibit or facilitate physical activity participation and long range adherence (Sallis, Hovell, Hofstetter, Faucher, Elder, Blanchard, Caspersen, Powell, & Christensen, 1989). Some of the variables that have been cited as associated with physical activity participation (or nonparticipation) include age, gender, occupation, smoking status (King, 1994); time restraints (Stenhardt & Dishman, 1989); cost associated with structured exercise (Salmon, Owen, Crawford, & Sallis 2003); self-motivation (Dishman, 1991); and self-efficacy (McAuley, Wraith, & Duncan, 1991). Despite evidence that some of these variables may affect exercise participation levels, however, few interventions have been designed, implemented, and measured for success in any systematic way to determine relative effectiveness in meeting the needs and preferences of individual clientele.

**Self-Efficacy**

In addition to demographic, characteristic, and setting variables that may be linked with the propensity to engage (or not engage) in regular physical activity, some psychosocial variables have also been hypothesized as functionally related. Self-efficacy provides one such variable example.

Self-efficacy is the primary cognitive variable in Bandura’s social cognitive model that emphasizes the role of self-referent thought in guiding human action and decision-making (Bandura, 1977, 1986). According to this model, self-efficacy -- defined as an individual’s belief in his or her capabilities to successfully execute a skill or set of target behaviors --, is the primary variable that influences choice of activity participation, effort
expended in that activity, and level of persistence when faced with challenges related to that activity (Bandura, 1997). Specifically, this social cognitive theory suggests that self-efficacy is the primary mechanism for mediating behavioral responses and that psychological interventions can be used to change the level and strength of belief that one can successfully perform a given activity (Bandura, 1977). In Bandura’s social cognitive model, expectations of personal efficacy are based on four major sources of information as follows: Enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological states. Within this model, enactive mastery experiences are believed to be the most influential source of information because it is based on personal mastery experiences. In other words, past successes raise efficacy expectations while repeated failures lower them, particularly for novice learners (Bandura, 1997).

Vicarious experiences or participant modeling provides a second important source of information about personal capabilities. In developing a level of self-efficacy, people do not rely strictly on mastery experiences as the sole source of information about their capabilities. Many people appraise their capabilities to perform a task in relation to the attainment of others. For example, people that observe a model successfully complete a task and then are physically guided through the task by the model have reported increased levels of self-efficacy (Feltz, Landers, & Raeder, 1979, McAuley, 1985). Verbal persuasion serves as a third method of strengthening people’s belief that they can perform a given task successfully by providing evaluative feedback and encouragement. Bandura (1997) has suggested that individuals who are persuaded verbally often increase their effort and sustain it more effectively when compared to those who focus on personal deficiencies when faced with challenging situations. Physiological state provides a fourth
variable in relation to self-efficacy. This variable captures the hypothesis that individuals who have high levels of arousal in stressful or taxing situations will demonstrate decreases in performance because they are not able to manage their physiological reactions to stress. Relatedly, individuals with low levels of self-efficacy, often conjure up negative thoughts about an event prior to engagement with that event, further increasing arousal levels beyond an optimum level.

Self-efficacy theory has been used in the psychological, educational and exercise science fields as a theoretical framework to understand a wide range of health, fitness, and academic-related behaviors. Some scientific work in relation to self-efficacy has been done in the area of physical activity and has included, for example, relationship to weight loss program effectiveness (Shannon, Bagby, Wang, & Trenkner, 1990); relationship to strength gains during circuit weight training in coronary artery disease patients (Ewart, Stewart, Gillian, & Keleman, 1986); predicting academic performance (Multon, Brown, & Lent, 1991); and exercise adherence behavior in middle-aged adults (McAuley, 1993).

Achievement Goal Orientations

Achievement motivation research within the education and sports domains has increased significantly in recent years and provides another psychological dynamic that is potentially important when studying physical activity participation and adherence. Achievement motivation, or as is commonly termed the achievement goal approach, has been used productively as a model for studying the motivational and affective variables that influence a variety of behaviors such as academic achievement (Skaalvik, 1997); motivation in physical education (Duda, 1996); and sports participation rates (Ames, 1992; Duda, 1989a). This goal perspective theory is characterized by an individual’s
perception of ability and how that individual defines success in an activity related
achievement domain. Generally, and simplistically, this area of research has shown that
in educational and sports settings individuals strive to demonstrate competence and avoid
displaying incompetence once committed to participation (Duda & Nicholls, 1992;
Ntoumanis & Biddle, 1999).

Perceptions of competence are based on two perspectives, one normatively based and
the other self-referenced. The first normative perspective, termed task-orientation,
involves a self-referenced model of ability where improvement and mastery of the skill or
activity to be performed is the primary focus (Pintrinch, 2000). The second self-
referenced perspective, termed ego-orientation, involves a normative referenced model of
ability in which perceptions of success are based upon demonstration of superior ability
in comparison to others (Boyd, Weinmann, & Yin, 2002).

In structured sport activity domains, one’s goal orientation has been reported to be
associated with a variety of psychological and behavioral responses. More specifically,
the behaviors that are directly related to one’s achievement orientation include
performance outcomes, effort, persistence, and choice of task difficulty (Nicholls, 1989).
For example, task-oriented individuals tend to perceive success as largely a function of
effort and persistence. In contrast, ego-oriented individuals tend to believe that winning
and excelling in front of peers are more important than individual improvement and skill
mastery (Kilpatrick, Bartholomew, & Riemer, 2003).

Nicholls (1989) additionally suggests that social context influences the type of
achievement orientation selected by individuals in a particular setting. For example,
situations that promote social comparisons by emphasizing competition, focus on
performance outcomes (e.g., winning), and promote social evaluation by significant others (e.g., adults, peers) encourages adoption of an ego-orientation, even for individuals who prefer a dispositional task orientation. In contrast, situations that emphasize the importance of self-improvement, learning, and mastery of skill should elicit task-involvement.

**Methods of Study**

As stipulated in the opening section of this dissertation chapter, research activity intent was twofold. First, efforts were made to correlate specific self-efficacy for physical appearance and goal orientation variables with individuals general participation and long range adherence characteristics in relation to structured physical activity. Second, known effective applied behavior analysis treatments were adapted, and designed and implemented specific to particular structured physical activity programming to determine their relative effectiveness on activity adherence.

**Qualitative/Survey Research**

Qualitative research designs currently dominate the applied educational literature and are perceived as effective in obtaining information relative to the psycho-social and cognitive dynamics of educational effectiveness (Merriam, 2001). Most of these methods are descriptive/correlational in nature, and provide multiple data collection and analysis strategies (e.g., questionnaires, surveys, interviews, and emic narrative description) to provide a rich, holistic, description of participants in natural settings of interest (Glesne, 1999).

In the psychological and exercise science literature, measures of physical activity adherence, self-efficacy, and goal orientation in sports and exercise have primarily used
questionnaires to understand some of the psychological factors that influence exercise behavior patterns for adult and clinical populations. Some researchers, for example, have studied self-efficacy and exercise adherence patterns in middle-aged adults (McAuley, Courneya, Rudolph, & Lox, 1994), measured achievement goal orientation preferences towards exercise for students enrolled in university-based physical activity courses (Boyd, Weinmann, & Yin, 2002); and discussed strategies for greater task involvement in sport for children (Duda, 1996).

The questionnaires employed in many of these studies have been modified for specific populations. For example, the Physical Self-Efficacy Scale (Ryckman, Robbins, Thornton, & Cantrell, 1982) has been used to predict exercise behavior patterns for middle-aged adults (McAuley, 1992; McAuley, Bane, & Mihalko, 1995); the Task and Ego Orientation in Sport Questionnaire (TESOQ, Duda, 1989b) has been used to predict achievement goal orientation preferences in youth soccer (Cresswell, Hodge, & Kidman, 2003); and achievement orientation perceptions in volleyball (White, 1996). The TEOSQ inventory is a modified version of Nicholls (1989) and his colleagues validated task and ego questionnaire used in the academic achievement domain. This scale also has been modified for individuals participating in structured university-based exercise classes to understand how students enrolled in university activity courses approach physical activity in group exercise settings (Goal Orientation Exercise Scale; Kilpatrick, Bartholomew, & Reimer, 2003).

The results of this line of research in the exercise domain has shown that perceived competence in a physical task can lead to increased perceptions of competence and is an important predictor of exercise adherence (Vallerand & Reid, 1984; McAuley, Wraith, &...
Duncan, 1991). However, as mentioned earlier in the introduction, many Americans are not meeting the recommended amounts of exercise for optimum health and over half of the population is completely sedentary (Dishman, 1994). One question that still remains unanswered is how individuals approach exercise (i.e., task or ego orientation). It may be assumed individuals enroll in structured physical activity classes due to a task-orientation locus where self-improvement and intrinsic motivation are the primary reasons for participation. However, empirical support for this assumption is needed.

On the other hand, research may show that individuals that do not regularly exercise may approach exercise with an ego-centered orientation where social comparison of physical attributes such as muscular strength, aerobic conditioning levels, and body size (i.e., overweight) may reduce one’s motivation for continued exercise participation if comparisons are made with others with greater physical attributes (Leary, 1992). In addition, it is important to investigate the possible correlations that may exist between self-efficacy, achievement goal orientation, and exercise adherence to learn more about the motivational factors that influence exercise participation.

Behavior Analysis

The direct observation of behavior has a long and productive methodological history in the psychological, sociological, and educational sciences. Generally, applied behavior analysis methods have been used to investigate a host of research areas such as psychiatric disorders (Kazdin, 1982); exercise participation in a range of populations (Perkins, Rapp, Carlson, & Wallace, 1986); and improvement in general academic instructional practices (Kamps, Leonard, Dugan, Boland, & Greenwood, 1991). Within these literatures, behavior analysis interventions have proven successful in enhancing
performance and exercise participation in healthy and clinical adult populations (Martin & Dubbert, 1982). Among those behavioral strategies that appear effective in producing change in exercise adherence patterns are goal setting (Martin et. al, 1984), and contingency management interventions (Allen & Iwata, 1984). Of additional potential appeal, though mainly supported in the physical education teacher preparation literature, is the use of feedback as a mechanism for changing behavior patterns in physical education and structured activity settings (Sharpe, Balderson, & So, 2004).

Applied behavior analysis is a field of study that relies on repeated measurement of a small number of subjects to assess the efficacy of specific treatments or interventions (Poling & Grosett, 1986). More specifically, applied behavior analysis designs focus on the application of operant and respondent principles to improve human conditions or change behavior in the near and long term (Pierce & Cheney, 2004; Sharpe & Koperwas, 2003). For example, principles of behavior change have been used to help individuals stop using drugs (Higgins & Katz, 1998); reduce phobic behavior (Jones & Friman, 1999); and improve social behavior in physical education classes (Sharpe, Crider, Vyhidal, & Brown, 1996).

A second characteristic of applied behavior analysis designs is the de-emphasis on generality of results. Behavior analyses’ primary goals include documenting interventions that will provide pragmatic and therapeutic solutions for participants in clinical and field-based settings (Sharpe & Koperwas, 2003). Generalization of findings is made available only through systematic replications of the original experiment by manipulating certain experimental factors (e.g., experimental setting, subject characteristics) over a series of carefully designed studies (Fuqua & Bachman, 1986).
In the sport and physical education literature, many applied behavior analysis designs have been used to remediate behavior or improve performance across a variety of sport settings and age groups. For example, a sportsmanship curriculum intervention has been used to improve social behavior in elementary students (Sharpe, Brown, & Crider, 1995); peer instruction has increased athletic performance on the football field (Ward, & Carnes, 2002); and public posting interventions have improved inappropriate on-court behavior in collegiate tennis players (Galvin, & Ward, 1998).

However, in the exercise literature, only a handful of researchers have used applied behavior analysis methods to document effective motivational strategies for short and long-term exercise adherence. Of the few studies available, Martin and Dubbert (1982), for example, investigated strategies for exercise promotion in healthy and clinical populations; Epstein, Koeske, and Wing (1984) analyzed the effectiveness of adherence interventions in obese children; and Perkins, Rapp, Carlson, and Wallace (1986) used a goal-setting procedure coupled with feedback and contingent reinforcement to increase aerobic exercise participation in nursing home residents. Further research, however, clearly remains to be conducted to identify specific strategies that are most effective in encouraging short and long-term exercise adherence in sedentary and moderately active adults.

**Statement of the Problem**

As introduced earlier, this dissertation research included multiple purposes. First, descriptive exercise adherence, self-efficacy for physical appearance, and achievement goal orientation data were collected on students enrolled in university-based physical activity courses. Second, correlations between self-efficacy for physical appearance,
achievement goal orientation data and exercise adherence data were analyzed. Finally, select behavioral interventions (e.g., goal directed feedback, public posting, and peer instruction) were implemented in efforts to increase the motivation and participation adherence characteristics of the experimental population over the course of the experiment.

**Research Questions**

This study included the following research questions:

1. What are the physical appearance self-efficacy levels in students enrolled in structured university physical activity courses?

2. What are the achievement goal orientation preferences of students enrolled in structured university physical activity courses (i.e., task or ego-centered goal orientation)?

3. What are the correlations among exercise adherence, physical appearance self-efficacy, and achievement goal orientations (i.e., task or ego-centered goal orientation)?

4. How does instructor goal setting and instructional modeling effect the cognitive (i.e., physical appearance self-efficacy and achievement goal orientations) and adherence dynamics of students enrolled in structured university physical activity courses?

5. How does public posting effect the cognitive (i.e., physical appearance self-efficacy and achievement goal orientations) and adherence dynamics of students enrolled in structured university physical activity courses?
6. How does peer instruction effect the cognitive (i.e., physical appearance self-efficacy and achievement goal orientations) and adherence dynamics of students enrolled in structured university physical activity courses?

**Guiding Hypotheses**

This dissertation included the following hypotheses:

1. Physical appearance self efficacy and a task goal orientation will be positively correlated with exercise adherence of students enrolled in structured university physical education activity courses.

2. Goal setting and instructor modeling will increase cognitive (i.e., physical appearance self-efficacy and achievement goal orientations) and adherence dimensions of students enrolled in structured university physical activity courses.

3. Public posting will increase the frequency of exercise per week within the primary experimental setting.

4. Peer-feedback and encouragement will increase the frequency of exercise per week within the primary experimental setting.

**Assumptions and Limitations**

**Scope**

This study was designed for a postsecondary undergraduate adult community in which the treatments were developed specifically for young adults who tended to exhibit less than optimal exercise and physical activity adherence patterns. The potential to generalize these findings to settings beyond the specific types of settings, situations, and sample population characteristics should be cautioned against.
Assumptions

The following assumptions guided this dissertation research:

1) It was assumed that the questionnaire instruments implemented in this dissertation were reliably utilized and construct, content, and criterion validated.

2) It was assumed that the behaviors displayed during the observation periods were an accurate representation of what occurred.

3) It was assumed that the behavior analytic and quantitative methods of data collection and analysis for this dissertation study were reliably implemented.

4) It was assumed that the participants observed and studied in this dissertation were representative of larger clientele groups exhibiting similar demographic and behavioral characteristics.

Limitations

This dissertation research was limited by the following:

1. Cognitive response data are limited by the assumed veracity and accuracy of self report.

2. Behavior and quantitative data on sample population activities are limited to only directly observable, overt behaviors.

3. Behavioral and quantitative data collected within this dissertation research are purely descriptive and not prescriptive.

4. Curriculum and treatment intervention development legitimacy is predicated on the acumen and judgment of the investigator/developer.
Summary and Significance

This dissertation research was first designed to provide important and substantive information relative to the role of self-efficacy for physical appearance and achievement goal orientation in relation to the ongoing societal and cultural challenge of exercise adherence. Next, potentially effective treatments drawn from the existing behavioral literature were developed in an effort to change adult participant behavior toward greater participation and adherence within a structured physical activity program. Finally, it was hoped that correlations may be drawn among the cognitive dimensions of self-efficacy and achievement goal orientation and the tendency to participate within and adhere to a structured physical activity program. Providing this type of information within a scientific model of inquiry should further the understanding of (a) the demographic and psycho-social character of respective regular exercise and non-exercise participants, and (b) educational interventions that may change non-exercise participants toward participation and adherence to a regimen of regular physical activity as recommended by the growing health, epidemiology, and medical literatures.
CHAPTER 2

METHODS

This chapter describes in detail two related studies that comprise this dissertation research. The first provided description of the potential relationships among physical appearance self-efficacy, achievement goal orientations, and exercise adherence tendencies among a diverse group of university students representative of the demographics of young adult populations. The second described the development and implementation of a set of behavioral strategies designed specifically to increase the motivation and exercise participation of a range of sedentary to moderately active college age adults.

Specific chapter sections include separate and distinct headings for Study I and Study II. Study I sections include the following headings: (a) Purposes, (b) Participants and Setting, (c) Study Participant Demographic Data Collection, (d) Self-Efficacy Scale for Physical Appearance, (e) Achievement Goal Orientation Scale for Physical Activity, (f) General Implementation Procedures, and (g) Data Analyses. Study II sections include the following headings: a) Purposes, b) Participants and Setting, c) Research Design and Order of Treatments, (d) Measurement Procedures, and (e) Procedural Implementations.
Study I

Purposes

Study I had four distinct descriptive purposes. The first purpose was to measure the physical appearance self-efficacy levels of an intact college age group consisting of a range of gender, personality, exercise tendency, and sport participation backgrounds. A second purpose was to measure the achievement goal orientation preferences (i.e., task or ego orientation) of all study participants. Third, both physical appearance self-efficacy and goal orientation preference measures were correlated to determine any functional relationships among these two measures. A fourth and final purpose of Study I was to determine through correlation analysis specifically how respective physical appearance self-efficacy and goal orientation preference measures may be functionally related to undergraduate student class attendance and participation effort exerted during structured physical activity class time when in attendance.

Participants and Setting

Fifty-one sedentary to moderately active adults (30 males, 21 females) enrolled in one of three university level structured physical activity elective classes were purposefully selected for Study I and relatedly Study II. Class content consisted of individually prescribed and group led weight training and nautilus conditioning exercises. Classes were conducted in a modern, well-equipped exercise and fitness facility located at a Midwest university. Two graduate students were the primary instructors for the three physical activity courses used in this study. Both instructors attended three training sessions led by the primary investigator of this dissertation study to ensure the reliability of treatment implementation, review course expectations, and syllabus information. The
instructors were provided with a department approved syllabus that is used for all weight training and nautilus conditioning classes at the university. Classes met three times a week for 9 weeks, with 50 minutes devoted to each class session. Participant ages ranged from 17 to 31 with a mean age of 22.14. All students enrolled in the three physical activity classes volunteered to participate in the study.

Study Participant Demographic Data Collection

A demographic and exercise adherence questionnaire was developed to collect descriptive information relative to the purposefully selected and intact participant group involved with Study I. The demographic questionnaire was close ended and was administered to each participant to obtain the following types of information: (a) number of years of regular exercise activity, (b) frequency and type of exercise activity within the past six months, and (c) general demographic information including age, gender, years of college completed, full-time or part-time student, and occupation. Refer to Appendix B for the complete demographic questionnaire illustration.

Self-Efficacy Scale for Physical Appearance (SEPA)

A Self-Efficacy Scale for Physical Appearance (SEPA) questionnaire was implemented to collect participant response information designed to measure each participant’s belief in their general self-efficacy and self-confidence relative to structured physical activity participation. Additionally, the SEPA questionnaire measured self-efficacy with respect to general physical activity abilities and presentation of physical self-confidence levels. The SEPA questionnaire was a modified version of the Physical Self-Efficacy Scale (PSE), and its subscales (Rychman, Robbins, Thorton, & Cantrell, 1982). The subscales included the Perceived Physical Ability (PPA) and the Physical Self-
Presentational Confidence (PSPC) scales. These scales were originally evaluated in a series of six studies contained in the original Rychman et. al. (1982) literature that provided strong evidence for the reliability, validity and general use in physical activity and sports settings.

The Likert-based SEPA questionnaire contained 10 response items with a range of 1 to 5 response levels for each question to indicate relative agreement or disagreement with each sentence provided. Minimal changes were made to Rychman’s original instrument to make the SEPA scale contextually match the setting for this dissertation study. Given the very limited editing from Rychman and his colleagues (1982) original questionnaire instrument, and only in the context of changing terms to specify structured physical activity participation, the questionnaire used in this portion of the dissertation research was assumed to contain necessary content, construct, and criterion validity as that of Rychman’s original questionnaire. Refer to Appendix C for a complete illustration of the SEPA questionnaire used in this dissertation.

Achievement Goal Orientation Scale for Physical Activity (AGOPA)

An Achievement Goal Orientation Scale for Physical Activity (AGOPA) questionnaire was implemented to collect participant response information designed to measure student goal orientation preferences (i.e., task or ego orientation) toward physical activity. This scale included 10 response items with a range of 1 to 5 for each item to indicate relative agreement with each particular statement. Refer to Appendix D for a complete illustration of the AGOPA questionnaire. AGOPA was a modified version of the Task and Ego Orientation in Sport Questionnaire (TEOSQ) which is comprised of two subscales, developed by Duda (1989b) and her colleagues. In the original TEOSQ
questionnaire, the first subscale contained a battery of ego-orientation questions and the second subscale consisted of items related to a task-orientation.

With respect to the AGOPA questionnaire used in this dissertation research, minimal changes were made to the original TEOSQ to make the instrument more contextually appropriate for structured physical activity settings. This was necessary due to the TEOSQ being predominantly used in competitive sport and athletic situations. The TEOSQ has been shown to be an effective instrument for measuring achievement goal orientations in many structured sport and athletic settings (Duda 1992, Duda, Chi, Newton, Walling, & Catley, 1995), but has yet to be modified and used in structured exercise or physical activity settings. Given the limited editorial changes made to the original version of the TEOSQ, content, criterion, and construct validity was assumed to remain intact. One cautionary statement must be made with respect to the validity concerns of this instrument, however, for though the original TEOSQ scale has received widespread acceptance and use in the sport psychology research literature and is assumed to be valid; there does not exist in the literature a reported study that specifically supports its validity in any data-based manner via traditionally accepted validity testing techniques.

General Implementation Procedures

During the first class meeting for each of the three experimental classes used in Study I, all class participants attended a one-hour orientation session at which they were given details of the requirements of the class and informed that they would be asked to complete a battery of questionnaire inventories at specified points throughout the semester. Participants completed a human subjects approval form that explained research
details, ensured their anonymity of response and experimental data results, and provided the option of withdrawing from the study at any time (refer to Appendix E). During each class period in which the students were asked to fill out a questionnaire, participants were repeatedly asked to read each question carefully and respond as accurately as possible. Students were also repeatedly told that all answers would be confidential.

The Demographic and Exercise Adherence questionnaire, SEPA questionnaire, and AGOPA questionnaire were administered to all of the participants in each of the three experimental classes during the first week of this dissertation study. SEPA and AGOPA questionnaires were also administered three additional times at specified intervals during implementation of the three intervention strategies as described in Study II.

**Data Analyses**

Study I was descriptive in nature. Three questionnaires of (a) demographic information and exercise prevalence, (b) self-efficacy for physical appearance (SEPA), and (c) achievement goal orientation for physical activity (AGOPA) were administered to a purposefully selected and intact undergraduate student population. Each questionnaire response data for each individual Study I participant and for each of the three structured physical activity classes as a group were reported in tabular form. For descriptive purposes, means, ranges, and standard deviations of each of the three measures (i.e., for the demographic exercise adherence data a 5 point range was constructed to indicate various levels of exercise activity [refer to Appendix B]; and for each of the two SEPA and AGOPA questionnaires an aggregate respective self-efficacy and goal orientation score was derived from the 5 point Likert scale questionnaire response data) was used as indicators of the respective measures.
A second purpose of descriptive Study I was to determine any meaningful or significant correlations among the three questionnaire response areas of (a) demographics of exercise adherence, (b) physical appearance self-efficacy, and (c) goal orientation. Three correlations were conducted as follows:

1. Demographics of exercise adherence and physical appearance self-efficacy level.
2. Demographics of exercise adherence and goal orientation.
3. Self-efficacy level with goal orientation.

To accomplish these correlations, each individual study participant's data indice (i.e., one numeric score for each of the three indices) in accordance with the three questionnaire response measures were inputted into an appropriate SPSS statistical software package to conduct Pearson Product Moment Correlation Coefficients for the three correlations of interest.

Study II

Purposes

While Study I was descriptive/correlational, Study II was empirical. Empirical purposes were designed to determine: (a) exercise adherence levels within the experimental classes (b) changes in physical appearance self-efficacy as a function of treatment exposure and (c) changes in achievement goal orientation as a function of treatment exposure. Specific treatments included instructor-set goals/modeling, public posting, and peer-feedback.
Participants and Setting

Participants and setting for Study II were identical to Study I. Again, study participants included 51 sedentary to moderately active adults (30 males and 21 females) enrolled in one of three university structured physical activity classes. Class content consisted of individually prescribed and group led anaerobic exercise routines. Classes were conducted in a modern, well-equipped exercise and fitness facility located at a Midwest university. Classes for the Study II component to this dissertation met three times a week for 9 weeks (50 minutes per class session).

Research Design and Order of Treatments

Study II implemented a simple repeated measures reversal treatment design (ABACADA; and ABADACA) across classes and across participants to determine the relative effectiveness of three instructional strategies on increasing exercise adherence, self-efficacy levels, and achievement goal orientation. Within this design, three separate and distinct treatments of (a) instructor-set goals/modeling, (b) public posting, and (c) peer feedback were implemented. The following treatment order was used:

Class 1. Baseline, Instructor-Set Goals/Modeling, Baseline, Public Posting, Baseline, Peer Feedback, Baseline.

Class 2. Baseline, Instructor-Set Goals/Modeling, Peer Feedback, Baseline, Public Posting, Baseline.

Class 3. Class was used as a comparative control group with limited instructor organization and instruction on basic exercise skills the only treatment present.

The instructor-set goals/modeling treatment was used during the first treatment phase for Class 1 and 2 because many of the participants were novice exercisers who required instruction and guidance at the beginning of the semester to learn the proper technique and methods for safe and effective exercise participation.
Adherence

Adherence to exercise was measured in the following manner. The first measure was class attendance. The attendance criterion was analyzed using a 5-point scale ranging from: (5 points - two or fewer absences, 4 points - three absences, 3 points - 4 absences, 2 points - five absences, and 1 point - 6 or more absences). The second adherence measure was defined as the amount of active participation during class time (i.e., number of sets completed per exercise session). The amount active participation per class session was also analyzed using a 5-point scale collected for each exercise session ranging from (5 points - 25 or more sets, 4 points - 20-24 sets, 3 points - 15-19 sets, 2 points - 10-14 sets, 1 point - 9 or fewer sets).

The primary instructor in the structured physical activity classes kept daily attendance records. The participants were also required to complete a daily exercise log to keep track of all exercise set activity. On the exercise logs, student participants recorded the number of sets, repetitions within a set, and weight lifted for all training exercises performed during each class period that they attended.

Self-Efficacy Scale for Physical Appearance (SEPA)

The Self-Efficacy Scale for Physical Appearance (SEPA) consisted of ten questions on a 5-point likert scale ranging from (1) strongly agree to (5) strongly disagree (Refer to Appendix C). SEPA measured physical self-efficacy which included two underlying dimensions of (a) a perceived physical ability factor, and (b) a physical self-presentation factor. More specifically, SEPA was created to measure perceived competence in performing physical tasks in structured physical activity courses and as a measure for
documenting participant level of confidence to exercise and display their physical abilities and skills in front of others. Participants were administered SEPA during the first week of Study I and after each behavioral treatment was implemented during the course of Study II.

**Achievement Goal Orientation Scale for Physical Activity (AGOPA)**

The achievement goal orientation scale (AGOPA) consisted of ten questions on a 5-point likert scale ranging from (1) strongly agree to (5) strongly disagree (Refer to Appendix D). The achievement goal orientation scale questions asked the respondents to indicate their motivational approach towards physical activity (i.e., task orientation or ego-orientation). The AGOPA scale was also administered with the onset of Study I and at the end of each treatment implementation phase of Study II.

**Procedural Implementation**

**Timing of Treatment Conditions**

In Study II, three generally accepted behavior analysis strategies were implemented during the 12-weeks of Study II activity. Again, the three separate and distinct treatments included instructor-set goals (ISG), public posting (PP), and peer-feedback (PF). The table below represents the order of treatment implementation for each experimental class along with corresponding baselines (A) in which no treatment was present:

Class 1: A – ISG–A – PP – A – PF – A – ISG – A

Class 2: A – ISG – A – PF – A – PP – A – ISG – A

Class 3: A – ISG → A

Each of the experimental phases of Study II lasted approximately two weeks with each baseline lasting for one week. Again, all three classes received the instructor-set
goals/modeling intervention at the beginning of Study II due to the novice character of each class participant group. For Class 1 and Class 2 a treatment reversal was implemented in which Class 1 received public posting and then peer feedback, and Class 2 received these two treatments in reverse order. Both Class 1 and Class 2 received the instructor-set goals treatment at the end of the study, while Class 3 acting as a comparative control received no other treatment after their instructor-set goals initial treatment exposure for the remainder of Study II.

*Instructor-Set Goals/Modeling*

The first strategy, instructor-set goals/modeling was a combined behavioral treatment designed to motivate participants to attend class on a regular basis and encourage students to maximize the amount of class time actively with participation in exercise activity. During this treatment phase, the first three minutes of every exercise session was taken up by primary instructor review of the exercise goals for the class. Goals included attendance, performing each exercise correctly and with effort, and maximizing the number of sets accomplished with each class session. After stressing the importance of attendance in the context of regular exercise effectiveness, a first goal encouraged the students to complete as many weight training sets as possible during the 50-minute class sessions. This goal was established to motivate and encourage students to exercise at a high intensity and utilize class time to the best of their ability. Students were secondarily encouraged to alternate muscle groups between sets (e.g., perform a set of bench press and then immediately perform a set of bicep curls) to maximize the set efficiency performed.

A next goal encouraged participants to use proper exercise form and to increase the amount of weight lifted by five to ten percent when a specific weight training exercise
could be repeated more than 15 times with perfect form. This goal was used as a general guideline for students to monitor their own exercise intensity. A related goal encouraged students to perform at least one exercise for each major muscle group at least once a week to prevent potential muscular strength imbalances and injuries.

After the instructor reviewed the goals in the beginning of each class for this experimental phase, class participants selected from a variety of circuit training work outs that were posted on the fitness facility wall (i.e., upper body circuit, lower body circuit, full body workout). While each student participant actively participated in the circuit training routines, the primary instructor gave corrective feedback and modeled appropriate weight training technique for students needing instructional assistance.

Public Posting

The second treatment, termed public posting, is a behavioral technique that has generally involved a public display of progress — such as crediting athletes for completing a task or performance above a targeted goal — designed to recognize achievement. In this treatment phase, the instructor asked all of the participants to gather around a publicly displayed poster to record the amount of sets completed for that particular exercise session. Students who were absent received an “A” next to their name. Participants that performed a high number of sets were recognized and praised in front of their peers for performing at a high level during class time. Behavioral information remained publicly posted on the fitness room wall for each participant to view for the duration of this experimental phase. With each consequent class session within this treatment phase the instructor spent 2-3 minutes during the beginning and end of each class going over the publicly posted information and specifying those that (a) had
improved and performed beyond expectations, (b) had missed class or had deficiencies in their class performance, and (c) as a group were attending to general class goals.

**Peer-Feedback**

This treatment strategy required each class participant to exercise with a partner. The objective of this treatment was for each class participant to monitor, motivate, and encourage their partner rather than relying on the primary instructor for corrective feedback, motivation, and instructional advice. Specifically, participants were asked to correct improper lifting technique and use words of encouragement (e.g., “let’s go”, “push it” “one more rep”) during each exercise session. The primary instructor’s role during this treatment phase was to provide 1-2 minutes of general advice at the beginning of each class reminding the entire class of important instructional and motivational cues, and to make sure that during each class participants remained in pairs throughout their exercise session. During this treatment phase, the instructor avoided encouraging the students or providing corrective feedback during the main body of the class, and during this phase no public posting of goal-based information was made available.

**Data Analyses**

Again, the purposes of Study II included analyzing empirically the relationship between the three treatment exposures and changes in exercise attendance and adherence, physical appearance self-efficacy, and achievement goal orientation. Changes in adherence were analyzed using the 5 point scale for set completion, and behaviorally by graphically analyzing the data using generally accepted visual inspection methods including those that pertain to the magnitude and rate of change in behavior. Magnitude refers to the amount of change in behavior and is measured by examining mean and level
changes across treatment phases. Rate refers to the speed of change in behavior across treatment phases and is measured by trend and latency changes across the phases of an experimental design (Sharpe & Koperwas, 2003).

The self-efficacy and achievement goal orientation questionnaire data were analyzed per individual student participant within and across classes, and by aggregating each class's data with each survey implementation and comparing class-by-class averages for each of the SEPA and AGOPA scales using a traditional static group pre/post test repeated measures design using a T-test statistic.

Summary

A productive literature exists that demonstrates that specific psychological variables and behavioral strategies are influential determinants of exercise adherence behavior across a variety of settings and age groups. This dissertation study used a mixed method approach to research and development efforts to add to the existing exercise adherence literature. In the existing literature, self-efficacy has been shown to be an important psychological predictor of behavior change for a variety of health-related behaviors including exercise. However, the relationships among physical appearance self-efficacy, achievement goal orientation, and behavioral determinants of effective instructional and motivational practice in changing exercise adherence behavior patterns has not been extensively examined in the exercise and psychological research domains. In this dissertation study, the correlational and behavioral data may have broad implications for professionals and researchers that are involved in promoting exercise and physical activity participation and long term adherence. In addition, individual differences in terms of exercise experience, and physical activity participation were also analyzed.
which may provide more information for health, fitness, and medical professions in relation to the development of appropriate strategies to encourage individual clientele to initiate and continue to exercise for a lifetime.
CHAPTER 3

RESULTS

This chapter describes the results of two related studies that comprise this dissertation study. The chapter is divided into two separate and distinct sections in accordance with the CHAPTER 2 methodology description. The first section is devoted to Study I and provides data specific to participant demographic descriptions, and correlation data among participant self-efficacy for physical appearance, achievement goal orientation, and participant effort scores. The section of this chapter, labeled Study II, first presents behavioral data in accordance with the three treatments introduced (Instructor-Set Goals/Modeling, Public Posting, and Peer-Feedback) and changes in measures of exercise attendance and participant effort. Next, through use of a 4x3x2 MANOVA statistic, comparisons among participant effort scores, past exercise history, and gender are provided.

Study I

Again, Study I’s intent was to (a) describe the demographic characteristics of a typical college/university population enrolled in a structured fitness and exercise course, and (b) determine any correlations among measures of exercise adherence, physical appearance self-efficacy, and goal orientation.
Demographic Analysis

The demographic characteristics of all participants across the three purposefully selected fitness and exercise classes described in Chapter 2 are presented in Table 1. The data set contained within Table 1 included results from administration of The Demographic and Exercise Prevalence Questionnaire (see Appendix B). This questionnaire was administered in accordance with Chapter 2 procedural description to all participants within the three experimental classes on the first meeting day of each class to gather descriptive information about the study participants. Table 1 first shows that there were a relatively equal mix of males and females across classes, albeit with a slightly larger proportion of males within Class 1 and 3. Next, there existed a range of academic standing across classes, with an age range approximating a typical senior level student. Most study participants were also full time students and exhibited a relatively equal mix across classes among regular exercisers and non-exercisers.

Correlational Analyses

In addition to the demographic and exercise prevalence data represented in Table 1, and extracted via the questionnaire contained within Appendix B; two additional questionnaires were administered in accordance with the procedural descriptions in Chapter 2. These questionnaire data included information relative to self efficacy with respect to how one perceives their physical appearance (refer to the Self-Efficacy Scale for Physical Appearance, SEPA, Appendix C), and achievement goal orientation tendencies dichotomized by task- or ego-orientation (refer to the Achievement Goal Orientation Scale for Physical Activity, AGOPA, Appendix D). Each of these latter two questionnaires were administered during the first class meeting for each experimental
Table 1

Demographic Characteristics by Experimental Class.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>n=9</td>
<td>n=10</td>
<td>n=11</td>
</tr>
<tr>
<td>Females</td>
<td>n=5</td>
<td>n=10</td>
<td>n=6</td>
</tr>
<tr>
<td>Mean Age</td>
<td>21.21</td>
<td>24.6</td>
<td>20.6</td>
</tr>
<tr>
<td>Range (Age)</td>
<td>(17-33)</td>
<td>(18-31)</td>
<td>(19-24)</td>
</tr>
<tr>
<td>Regular Exerciser</td>
<td>No=5</td>
<td>No=7</td>
<td>No=5</td>
</tr>
<tr>
<td>(3 times per week, 35mins)</td>
<td>Yes=9</td>
<td>Yes=13</td>
<td>Yes=12</td>
</tr>
<tr>
<td>Length of Exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regularity (Range)</td>
<td>(1mon.-7yrs)</td>
<td>(1mon.-5yrs)</td>
<td>(6 mon.-4 yrs)</td>
</tr>
<tr>
<td>Full/Part-Time Student</td>
<td>Full=14</td>
<td>Full=17</td>
<td>Full=15</td>
</tr>
<tr>
<td>Part=0</td>
<td>Part=3</td>
<td>Part=2</td>
<td></td>
</tr>
<tr>
<td>Academic Standing</td>
<td>Fr.=1</td>
<td>Fr.=1</td>
<td>Fr.=2</td>
</tr>
<tr>
<td>So.=5</td>
<td>So.=4</td>
<td>So.=5</td>
<td></td>
</tr>
<tr>
<td>Jr.=2</td>
<td>Jr.=5</td>
<td>Jr.=6</td>
<td></td>
</tr>
<tr>
<td>Sr.=6</td>
<td>Sr.=10</td>
<td>Sr.3</td>
<td></td>
</tr>
<tr>
<td>Grad.=0</td>
<td>Grad.=0</td>
<td>Grad.=1</td>
<td></td>
</tr>
</tbody>
</table>

Note. Ranges in Parentheses.

class and at specified intervals throughout the experiment in accordance with Chapter 2 procedures. From the questionnaire data, correlation analyses were then performed across demographic, self-efficacy, and goal orientation data. It should again be noted that for legitimacy of correlation purposes a 5 point range was constructed for the demographic and exercise prevalence data to indicate various levels of exercise activity and to match
with the 5 point SEPA and AGOPA questionnaire scales. Three correlations were
carried out as follows:

1. Self-efficacy and goal orientation.
2. Exercise adherence and physical appearance self-efficacy.
3. Exercise adherence and goal orientation.

Correlations were calculated using each individual study participant’s data indices in
accordance with the three questionnaire response measures to conduct Pearson Product
Moment Correlation Coefficients for the three correlations of interest. Study 1 correlation
data were extracted from the initial questionnaire administrations within the first class
meeting of each experimental class and prior to any treatment implementation. This was
an important study feature in relation to ensuring a lack of treatment contamination with
respect to discovering the naturally existing potential correlations among these variables
and within these types of sample populations.

The correlations between self-efficacy, achievement goal orientation, and participant
effort data are shown in Table 2. First, the correlations between achievement goal
orientation (AGOPA) and self-efficacy for physical appearance (SEPA) scores for all
three classes were analyzed. The correlational analyses showed that self-efficacy and
achievement goal orientation scores were not statistically significant within the initial
pre-treatment Study 1 comparisons across within all three experimental classes. Within
Class 3, and interesting to note albeit not to be confused with Study 1 descriptive
correlation data, the correlation between self-efficacy and achievement goal orientation
was statistically significant post treatment (.626*, p<.05). From a treatment perspective,
Table 2

Pearson R Correlations Between SEPA, AGOPA, and Participant Effort Data

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 (n=14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGOPA/SEPA</td>
<td>.528</td>
<td>-.042</td>
</tr>
<tr>
<td>SEPA/Effort</td>
<td>.064</td>
<td>.007</td>
</tr>
<tr>
<td>AGOPA/Effort</td>
<td>.227</td>
<td>-.042</td>
</tr>
<tr>
<td>Class 2 (n=20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGOPA/SEPA</td>
<td>-.074</td>
<td>-.60</td>
</tr>
<tr>
<td>SEPA/Effort</td>
<td>-.309</td>
<td>-.626</td>
</tr>
<tr>
<td>AGOPA/Effort</td>
<td>-.395</td>
<td>.504</td>
</tr>
<tr>
<td>Class 3 (n=17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGOPA/SEPA</td>
<td>.452</td>
<td>.626*</td>
</tr>
<tr>
<td>SEPA/Effort</td>
<td>-.468</td>
<td>-.099</td>
</tr>
<tr>
<td>AGOPA/Effort</td>
<td>.036</td>
<td>.059</td>
</tr>
</tbody>
</table>

Note. AGOPA=Achievement Goal Orientation for Physical Activity; SEPA=Self-Efficacy Scale for Physical Appearance. *p<.05.

and at risk of getting ahead of ourselves regarding a discussion of dissertation results, this correlation has potentially important implications.

The next correlation analysis of Study 1 — physical appearance self efficacy and exercise adherence -- also showed a non-significant relationship for all three experimental classes. As Table 2 shows, the correlations were Class 1 (.064, .007), Class 2 (-.309, -.626), and Class 3 (-.468, -.099) respectively. Similarly, the third and final
correlation analysis of Study 1 – goal orientation and exercise adherence -- revealed a non-significant relationship for all three experimental classes. Table 2 shows correlations of Class 1 (.227, -.042), Class 2 (-.395, .504), and Class 3 (.036, .059) for these data comparisons.

Interestingly, and to be elaborated upon in the Chapter 4 discussion, the correlation results of Study I did not support the existing literatures in the sport and exercise domains that suggest that self-efficacy and a task orientation are important predictors of exercise and sports participation adherence (Duda, Chi, Newton, Walling, & Catley, 1995; Kilpatrick, Bartholomew, & Reimer, 2003; McAuley, Wraith, & Duncan, 1991). In contradiction to prevailing literature, initial correlation findings showed that typical university students enrolled in structured physical activity classes primarily adopt an ego orientation toward structured exercise, however, do not connect physical appearance self-efficacy in a meaningful way with class attendance or structured physical activity participation.

Study II

Study II results describe in behavioral and statistical ways the effects of introducing three separate and distinct treatments of Instructor-Set Goals/Modeling, Public Posting, and Peer-Feedback to the types of individuals that comprised the three experimental classes within this dissertation study. Changes were measured by participant attendance and effort exerted during class time as a result of treatment exposure.

Applied Behavioral Analysis Results

The results of Study II were first graphically analyzed using generally accepted visual inspection methods as described in Chapter 2 and within the guidelines specified in the
text *Behavior and Sequential Analysis* (Sharpe & Koperwas, 2003). In accordance with these descriptions there exist two generally accepted categories that are used to visually inspect graphed data. The first category is *magnitude*, or amount of change, and the second category is *rate*, which is the speed with which changes occurs. Magnitude is measured in two ways. First, by comparing mean changes across treatment phases, and second by comparing the level difference from the last point in a first experimental phase with the first point within the next experimental phase. Rate, or the speed with changes occurs, is analyzed by examination of the trend or rate of increase or decrease line that the data follows within and across experimental phases, and by examination of the timing or relative latency with which a trend may take place within the experiment.

![Graph](image-url)

*Figure 1 - Total Number of Absences Per Exercise Session*
Figures 1-3 show percentage of students absent across all treatment phases for participants enrolled in Class 1, as well as the differential treatment implementation orders within and across classes. The reader should be reminded that akin to applied behavior analysis methodology, an “A” phase indicates a baseline or an experimental phase in which no treatment is present, and a “B” phase indicates the presence of a specified treatment for the duration of that experimental phase.

Visual inspection of Figure 1 shows an initial upward trend in total absences for the goal-setting (GS) treatment condition, and then a continuing downward trend in the total number of absences during consequent public posting (PP) and peer-feedback (PF) treatment phases. Figure 1 also shows that peer-feedback had the most influential effect on reducing the percentage of absences, and this trend continued into the last return to baseline or short-term maintenance phase at the end of the study. A mean analysis across treatment phases for Class 1 showed that public posting (mean=2.75) and peer-feedback (mean=1.25) had substantially lower mean scores than the goal-setting intervention (mean=4.25). Furthermore, the amount of change from the end of one phase to the beginning the next phase (i.e., level analysis) showed that after the second and third baseline phases, public posting and peer-feedback had an immediate positive effect on class attendance for Class 1. Begging further across class comparison analysis in discerning relative treatment effects, and as a function of re-arranging treatment order across classes, the Figure 1 data for Class 1 initially points to the potentially superior effectiveness of the peer-feedback treatment with respect to immediate and well maintained effects in increasing class attendance. Clearly, however, the data in Figure 1
could also be interpreted as a latent and multiple treatment effect over the course of repeated exposure to different methods of increasing class attendance.

Figure 2 - Total Number of Absences Per Exercise Session

Figure 2 show the attendance data for Class 2. In this class, the treatment order was reversed to analyze the potentially differential effects of public posting and peer-feedback treatments. The graphed data in Class 2 show some similar trends to Class 1. First, both peer-feedback and public posting intervention phases demonstrated decreases in the percentage of participants that missed class when compared to the goal-setting intervention. In terms of mean number of absences within and across phases, the goal-setting treatment had less of an influence on class attendance (mean absences=3.75) when compared with the peer-feedback (mean absences=1.25) and public posting (mean absences=1.25) experimental phases. Interestingly, further analysis of Figure 2 showed that as soon as the goal-setting treatment ended, there was an immediate decrease in the
percentage of students absent with the consequent baseline phase (level change; see data points 6 & 7). The data represented for Class 2 potentially verify the superior effectiveness of the peer-feedback treatment due to the relatively more immediate effect on absence data in relation to the data contained within Figure 1 where the public-posting treatment was introduced in reverse order. Additionally interesting, however, is the artifact within the Class 2 data that demonstrates the substantially lowered absence rate as a function of the goal-setting treatment removal, leading to the inference that a time and labor intensive procedure whereby students must articulate and record class goals provides an aversive condition that functionally operates in the opposite manner as this particular treatment was intended.

The results of a goal setting/modeling only intervention is graphically illustrated in Figure 3 for Class 3. This class operated as somewhat of a comparative control to the other two treatments of public-posting and peer-feedback in that the goal-setting treatment was a naturally occurring instructional component of these classes in prior semesters and something that students may have expected as a function of course
enrollment. In corroboration with the aversive effect articulated within description of the
Figure 2 and Class 2 attendance data, data contained within Figure 3 shows an upward
trend in the total percentage of absences during the course of the Study II experiment.
While in contrast to Class 1 and 2 data, the data for Class 3 demonstrated an initially
more positive effect on attendance, over time and in the absence of the other
experimental treatments the repeated goal setting/modeling intervention had a negative
effect as the study progressed.

Figures 4-6 represent participant effort data for the three classes observed for this
dissertation study. This was felt to be an important second measurement tool for while at
one level it is important to record the relative attendance or adherence to a structured
exercise program once deciding to enroll, it is also important to determine the relative
participation characteristics once attending. An effort measure was therefore included
within the Study II analysis, and specified via Chapter 2 as the average number of
exercise sets completed per individual participant. In Class 1, Figure 4 data showed that
public posting had the greatest positive effect on student effort. A clear increase in the
effort measure was consistently evident from the goal-setting to the public posting phase
of the experiment, which then evidenced a nominal decrease from public-posting to peer-
feedback phases. Specifically, a positive data trend was evident once introducing the
goal-setting treatment, a consistently maintained increase was then seen within the
public-posting phase, and a negative trend was evidenced with the peer-feedback phase.
The positive level change from goal-setting to public-posting, and in contrast from
public-posting to peer-feedback phases of the experiment lend additional support.
Analysis of Figure 4 showed that exposure to each of the three experimental treatments
increased the amount of effort exerted during class time, with the public posting
treatment appearing the most effective.

![Figure 4 - Average Number of Sets Completed Per Exercise Session](image1)

![Figure 5 - Average Number of Sets Completed Per Exercise Session](image2)
As can be seen in Figure 5, the treatment order was reversed to show the potential differential effects of public posting and peer-feedback treatments on participant effort levels. In Class 2, the graph shows a slight upward trend in participant effort data (i.e., sets completed) across all three treatment phases, with data demonstrating that the three treatment conditions each had a positive effect on the amount of effort exerted during class time compared to initial baseline data. The mean scores across the three treatment phases included the following: goal-setting (mean=194.50), peer-feedback (mean=241.17), and public posting (240.67). The consistent trend and concomitant mean comparison data contained in the Figure 5 representation of Class 2 lend further support for the superior effectiveness of the public posting treatment when compared to Class 1 data specific to participant effort expended when attending a structured activity class.

Figure 6 – Average Number of Sets Completed Per Exercise Session

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In further corroboration of the participant effort results described for Class 1 and 2, the Class 3 data contained within Figure 6 first shows a nominal positive effect when introducing the goal-setting treatment. However, as the experiment progressed for Class 3, a gradual and consistent negative trend for participation effort was evidenced throughout the data collection phase. Figure 6 showed that goal-setting did not increase participant effort levels across the duration of the study (total number of sets completed, mean=182.25). In fact, as the study progressed, the graph illustrates a negative trend. When comparing the striking differences in participation effort across classes, it is clear that goal-setting may be a contraindicated treatment given the opposing data trends when public posting or peer-feedback treatments are present.

Multiple Analysis of Variance

At the recommendation of some of my dissertation committee members, a post-hoc analysis was completed to provide additional insight concerning the demographic and behavioral variables that are included in this dissertation study. Specifically, a 4X3X2 multiple analysis of variance (MANOVA) was implemented to examine the potential relationships between the following factors: (a) four factors for participant effort scores (i.e., number of sets completed) at baseline and after each treatment (b) three factors for exercise history (low, intermediate, and high levels of past exercise experience), and (c) two factors for gender (male and female).

The MANOVA analysis was completed to examine whether there were statistically significant differences in how male and female adults with differing levels of past exercise experience participate in structured physical activity as measured by an effort score. Effort scores were factored with four distinct levels within this analysis to indicate
changes as a function of exposure to the various treatments provided with this dissertation study. Of particular interest was testing whether significant differences exist between participant effort levels (i.e., sets completed), gender, and past exercise experience (i.e., low, high experience); and as a function of treatment exposures designed to improve participation effort. The results of this analysis should be reviewed with caution due to a number of statistical assumptions related to the power of the experiment that were violated including:

1. The sample size (n=51).
2. The significance level (.05).
3. The size of the treatment effects (Keppel, 1991).
4. The lack of homogeneity of variance across individual participants.

Specifically, according to Keppel (1991), a sample size of about 50 with a significance level of (p<.05) will produce a low level of power. Furthermore, if the findings of the MANOVA are statistically significant, the magnitude of the treatment effects will be relatively low considering the sample size used in this dissertation study (Keppel, 1991). Last, the variance across individual participants within this study was not similar, violating a basic assumption of parametric statistical analyses. Additional measures of self-efficacy, achievement goal orientation, and adherence were not included in the MANOVA analysis due to the violation of the statistical assumptions mentioned above (i.e., small sample size, size of treatment effects) and due to the concern that if more factors were added, the data would be spread even thinner across cells which would further limit the potential of finding statistically significant results.
The results of the MANOVA are shown in Table 3. First, the relationship between gender and participant effort scores (i.e., sets1, sets2, sets3, sets4) were not statistically significant (p<.05). Second, the MANOVA scores among exercise history and participant effort scores were .389, .045*, .424, and .279, respectively. The only score that was statistically significant was the interaction between exercise history, and the second set of participant effort scores (sets2). Finally, the main interaction between participant effort scores, gender, and exercise history revealed no statistically significant relationships.

Summary of Results

First, the demographic and correlation results of Study 1 demonstrated that the sample classes used in this study were consistent with the gender, exercise history, and academic status typical of large metropolitan universities that offer structured physical...
activity courses within their curricula. Next, and in interesting contradiction, the
correlation data contained within Study I did not support the current literature in relation
to the potential functional relationships among physical appearance self-efficacy, goal
orientation, or exercise participation. While this data emanates from a small sample size
and a limited demographic it begs further replication.

Next, the behavior analyses contained in Study II as a function of a three treatment
implementation demonstrated that while each of the two treatments of public-posting and
peer-feedback were effective in reducing absenteeism and increasing participation effort,
the public-posting treatment was generally superior in these regards. Interestingly, the
goal-setting treatment while oftentimes pointed to in the literature as an effective
pedagogical tool, was contraindicated. While clearly in need of further study, this was
hypothesized as due to its time and labor intensive character, viewed as a potential
aversive to students in these regards.

Last, and at the recommendation of some dissertation committee members, a post-hoc
statistical analysis showed no significant relationships among gender, exercise history,
and exercise effort. While this analysis should be viewed with great caution, it does point
to the need for greater study in the area of just what variables may be functionally related
to exercise adherence and relatedly exercise effort once adhering. Potentially, there exist
a variety of variables as yet undetermined that stimulate desirable, and not so desirable,
effects in this area. Additionally, the current literature may be too optimistic in stance in
relation to the variables that have been recommended as predictors of such – notably self-
efficacy and goal orientation.
CHAPTER 4

DISCUSSION

This study was designed to investigate the role of self-efficacy and achievement goal orientation theory in predicting activity participation and adherence behavior in students enrolled in university-based structured physical activity courses. A second purpose was designed to examine how known effective behavior analytic interventions (e.g., public posting, peer-feedback, etc.) might effect participant effort levels, class attendance, and be functionally linked to psychological motivational factors (e.g., self-efficacy, goal orientation). This study was considered important for a number of reasons. First, a wealth of research has confirmed that regular physical activity participation is one of the most important life style variable decisions that functionally influences and prevents the onset of many chronic diseases including: diabetes, cardiovascular disease, and obesity (Bouchard & Depres, 1995; Epstein, 1998); and that has a positive impact on psychological well-being (Babak et al., 2000; Biddle, 1995). Second, this study adds to the existing motivational and exercise literatures in relation to documenting potential applied behavior analysis pedagogical strategies that encourage long-term exercise participation and maintenance in structured physical activity settings.

In Study I of this dissertation research, the results did not support the existing motivational and exercise science literature that suggests that self-efficacy is an important and statistically supported predictor of relative adherence within structured physical activity settings.
activity programs (refer to Boyd, Weinmann, & Yin, 2002; Cresswell, Hodge, & Kidman, 2003; for a representation of the current research literature on this topic). Furthermore, the findings showed that a task orientation was not the primary motivational approach towards physical activity participation, in contradiction to the work of Duda and colleagues (see for example, Duda, Fox, Biddle, & Armstrong, 1992). In this study, the correlations between self-efficacy, achievement goal orientation, and participant effort data were not statistically significant (p<.05), except for one correlation in the Class 3 (see Table 2). Perhaps, the results from Study I differ from some of the existing psychological and motivational literature data for two reasons. First, many researchers have investigated the relationship between self-efficacy and exercise adherence using older populations (McAuley, 1993; McAuley, Bane, & Mihalko, 1995). For young adults, however, self-efficacy may not be a strong predictor of exercise adherence behavior. Specifically, university students may not adhere to structured exercise programs because of other factors such as: lack of time, smoking, drinking alcohol, and hours spent working and studying (King, 1994; Steinhardt & Dishman, 1989). This dissertation research, therefore, points to the importance of further study to determine with confidence the many potential multivariate relationships that may impact on the decision for or against initial exercise participation and related long range participation adherence.

A wealth of literature in the academic and sport domains also suggests that individuals that adopt a task orientation persist longer in face of challenges, have higher participation rates, and increases in effort than those who approach achievement settings with an ego-orientation (Boyd, Weinmann, & Yin, 2002; Nicholls, 1989; Skaalvik, Valas, & Sletta, 1994). However, in this study, a task orientation was not a significant
predictor of class attendance or participant effort levels during exercise. In fact, the findings showed that an ego-orientation was the preferred motivational approach to physical activity participation for the college age sample studied. Theoretical support for the adoption of an ego-orientation in exercise settings can be supported by examining extant social comparison theory (Williams, 1994). Social comparison theory suggests that many young adults participating in structured exercise may be motivated by comparing their physical abilities in relation to others, and are more concerned with outperforming their peers from a competitive locus, rather than exercising and participating in class for purely intrinsic reasons (e.g., the task of improving health or enjoyment).

The ego-orientation is also believed to be facilitated by a dominant focus on outside sources of achievement, rather than internal ones as described by a task orientation focus. In study II of this dissertation, the data supports the finding that instructional strategies that provide extrinsic feedback and methods that recognize outstanding performance (i.e., public posting, peer-feedback) influence participation and effort exerted during physical activity. These results, in an indirect manner and from a philosophical research position, may be used to argue in favor of a functional link with an ego-orientation as a predictor of exercise participation and long range adherence. Further study is clearly warranted in this area, however, prior to making definitive claims to this effect relationship.

In support of the research available in the general education (Harackiewicz & Sansone, 1991; Mento, Steel, & Karren, 1987) and applied behavior analysis (Brobst & Ward, 2002; Ward & Carnes, 2002; Ward, Smith, & Makasci, & Crouch, 1998) literatures, study II presented in this dissertation provided some behavioral data that supports the effectiveness of public posting and peer-feedback instructional strategies.
when working with young adult populations in structured physical activity settings. First, both interventions were demonstrated as effective in decreasing total number of class absences, and each had a positive influence on the total number of sets completed during class time when introduced to each of the two experimental classes.

In the academic and physical education teacher education literatures, peer-feedback instructional strategies have increased time spent engaged in academic and exercise-related behaviors, provided immediate error correction, and have successfully held students accountable for their performance (Crouch, Ward, & Patrick, 1997; Utley, Mortweet, & Greenwood, 1997). In study II, the peer-feedback intervention data supported the existing peer-mediated instructional literature. Specifically, peer-feedback reduced the amount of absences per exercise session compared to baseline levels and positively influenced participant effort levels during class time. Interestingly, the instructor led goals intervention introduced in all three dissertation research settings was documented as the weakest of the treatments; however, it is this type of general pedagogical method that is most frequently seen within structured exercise classes such as that studied. In this regard, what may be of future value is study into (a) why this instructional method is so prevalent in the face of a scientific body of evidence that other methods exist that are proven as superior in effectiveness, and (b) how one may go about ensuring that the scientifically documented methods in this study are more widely used by professional practitioners operating in structured exercise settings.

While this dissertation study provides a starting point to the study of documenting motivational and behavioral strategies that may influence exercise participation and non-participation in functional ways, some limitations are apparent and much remains to be
investigated in relation to understanding the psychological and behavioral determinants of exercise adherence. First, data collection was conducted using three university physical activity courses that were nine-weeks in length. This is a relatively short period of time and much longitudinal work remains to determine the genuine effectiveness of the types of instructional strategies that motivate adult clientele in relation to exercise adherence and long term physical activity participation. Next, further investigation is recommended to determine specifically what cognitive and behavioral variables are most influential and functionally related to participation or non-participation in structured physical activity settings. Finally, the questionnaire data needs to be reviewed with caution because accuracy of response is always a concern when using self-report data.

Ultimately, this dissertation study provides some recommendations for encouraging individuals who are involved in structured physical activity programs to attend and to regularly participate, and adds to the existing psychological literature in relation to questioning just how specific known cognitive variables influence adherence to exercise.
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APPENDIX A

LITERATURE REVIEW

This appendix is designed to provide a comprehensive review of the relevant literature in support of this dissertation study's experimental activities. Accordingly, this appendix is divided into the following sections of: (a) documentation of the state of exercise adherence, (b) review of the self-efficacy literature, (c) review of the achievement goal orientation literature as related to sport and structured exercise settings, (d) summary of respective applied behavior analysis and survey research methodologies, and (e) literature that supports use of the three general treatment approaches described in Chapter 2 of this document—goal-setting, public posting, and peer-feedback instructional strategies. This appendix closes with a brief summary of the potential contributions that this dissertation activity may make to the existing literature as described.

The Challenge of Structured Physical Activity Adherence

As introduced in Chapter 1, many children and adults are spending larger and larger periods of their daily lives engaged in sedentary activities. This activity change over time alone may be argued as having led to a rapid increase in the onset of many chronic diseases associated with lack of regular physical activity (Epstein, 1998; Salmon, Bauman, Crawford, Timperio, & Owen, 2000). The sedentary lifestyle habits of many Americans, for example, has led to a substantial increase in diabetes, cardiovascular disease, obesity, and hypertension, and certain types of cancer in the general population.
of both children and adults (Bouchard & Depres, 1995). What is particularly disturbing about this statement is that increases are being seen across these chronic diseases in children and youth. The alarming trend of chronic increases in the sedentary behavior of the general population, when coupled with the documented connection between sedentary behavior and disease risk factors, has led many researchers in the exercise science, public health, and sports psychology fields to examine why many Americans choose not to participate in regular physical activity or adhere to any sort of regular exercise program even though such participation has been shown to have a positive effect on overall health.

In specific relation to the challenge of adherence to a regular exercise program, researchers in the sports psychology and public health fields have reported that approximately 60% of Americans are not meeting the recommended amount of physical activity for optimum health and about 50% of the individuals who begin a structured exercise program quit within six months after beginning that exercise program (Dishman 1988, 1994). The percentage of individuals not meeting the recommended amount of physical activity is alarming considering that participation in regular physical activity has a number of physiological and psychological benefits that enhance health and extend life (Hagberg, et. al, 1994). For example, regular physical activity is supported as a key factor in reducing the prevalence of a host metabolic conditions and cardiovascular conditions associated with obesity including diabetes and cardiovascular disease (Bandura, 1997; Wei, Gibbons, Kampert, Nichamen, & Blair 2000).

Regular exercise participation has also been associated with improved psychological function, particularly in relation to a reduction in anxiety and stress (Tuscon & Sinyor, 1993). In addition, physical activity participation has been shown to lead to a
strengthening of the musculoskeletal system by improving muscle and joint function (Corbinn & Pangrazzi, 1993). This physiological benefit of regular exercise is a critical factor in maintaining functional capacity as one ages and may be one of the most important preventative measures in improving one’s general physiological health and quality of life (Bouchard, Shepard, & Stephens, 1994; Fieldings, 1995; Morganti, Nelson, Fiatarone, Dallal, Economos, Crawford, & Evans, 1995).

There is overwhelming evidence that physical activity has many physiological and psychological benefits. However, more empirical evidence is needed to understand why individuals tend to be largely nonparticipatory in regular physical activity, and when enrolling in a structured physical activity program why the large percentage of individuals tend to drop out and not continue to adhere to these programs. Many potential motivational, psychological, and situational variables may play a functional role in answer to these questions. In specific, literatures in the areas of self-efficacy and goal orientations may provide guidance in relation to structured physical activity participation and adherence behaviors. This dissertation, therefore, focuses on exploration from descriptive, correlational, and empirical stances to these questions. In this way, a scientific data base facilitative of encouraging greater participation and long term adherence to structured physical activity programs may be provided. A first objective of this dissertation (refer to Chapters 1 and 2) was designed to investigate how psychological determinants such as self-efficacy and goal orientation may be linked to exercise adherence behavior. A second objective was organized to examine how known effective behavior analytic interventions (e.g., public posting, peer instruction, etc.) might affect linked psychological determinants, and might alter in functional ways exercise
adherence behavior. Prior to undertaking such study, however, a knowledge of the literature in these areas was felt important to summarize to ensure adequate understanding of the constructs implemented and manipulated when engaging in scientific activity in this area.

The Exercise Adherence Literature

For over two decades, social learning researchers have studied exercise participation and adherence in attempts to understand the self-regulatory processes that influence physical activity behavior patterns. Within this scientific approach, some existing models of behavior change have been used as theoretical frameworks including: social learning (Bandura, 1986), self-motivation (Merkle, Jackson, Zhang, & Dishman, 2002), health belief model (Slenker, Price, Roberts, & Jurs, 1984), and theories of reasoned action (Ajzen, & Fishbein, 1980). Applications of these models of behavior change have provided some insight into the potential variables that may either functionally inhibit or facilitate physical activity participation and long range adherence (Sallis et. al., 1989). Some of the variables that have been cited as associated with physical activity participation (or nonparticipation) include age, gender, occupation, smoking status (King, 1994), cost associated with structured exercise (Salmon, Owen, Crawford, & Sallis, 2003), self-motivation (Dishman, 1991), and self-efficacy (McAuley, Wraith, & Duncan, 1991). Of the variables just mentioned, self-efficacy, or the degree with which an individual believes he or she can successfully perform a behavior, consistently has predicted exercise adherence (Marcus, Eaton, Rossi, & Harlow, 1994).
The Self-Efficacy Literature

Bandura's (1986, 1997) self-efficacy theory is a theoretical framework that emphasizes the role of self-referent thought in guiding human action and decision-making. According to this theory, self-efficacy is the primary variable that influences choice of activity participation, effort expended in that activity, and level of persistence when faced with challenges related to that activity (Bandura, 1997). Specifically, this social cognitive theory suggests that self-efficacy is the primary mechanism for mediating behavioral responses and that psychological interventions can be used to change the level and strength of belief that one can successfully perform a given activity (Bandura, 1977). In Bandura's social-cognitive model, expectations of personal efficacy are based on four major sources of information as follows: Enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological states. Within this model, enactive mastery experiences are believed to be the most influential source of information because it is based on personal mastery experiences. In other words, past successes raise efficacy expectations while repeated failures lower them, particularly for novice learners (Bandura, 1997).

Vicarious experiences or participant modeling provides a second important source of information about personal capabilities. In developing a level of self-efficacy, people do not rely strictly on mastery experiences as the sole source of information about their capabilities. Many individuals appraise their capabilities to perform a task in relation to the attainment of others. For example, individuals that observe a model successfully complete a task and then are physically guided through the task by that model have

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reported increased levels of self-efficacy (Feltz, Landers, & Raeder, 1979, McAuley, 1985).

Verbal persuasion serves as a third method of strengthening an individual’s belief that they can perform a given task successfully by providing evaluative feedback and encouragement. Bandura (1997) has suggested that individuals who are persuaded verbally often increase their effort and sustain it more effectively when compared to those who focus on personal deficiencies when faced with challenging situations.

Physiological state provides a fourth variable in relation to self-efficacy. This variable captures the hypothesis that individuals who have significantly high levels of arousal in stressful or taxing situations will demonstrate decreases in performance because they are not able to manage effectively their physiological reactions to stress before and during the attempt of a relatively challenging activity. Relatedly, individuals with significantly low levels of self-efficacy, often conjure up negative thoughts about an event prior to engagement with that event, further increasing arousal levels beyond an optimum level.

Self-efficacy theory has been used in the psychological, educational, and vocational domains to understand a wide range of health, fitness, academic, and career-related behaviors. In the academic and vocational literature, self-efficacy has been used as a psychological variable for understanding and predicting academic achievement (Lent, Brown, & Hacket, 1994; Lent, Brown, & Gore, 1997; Multon, Brown, & Lent, 1991) and influencing career choices and development (Hackett, 1995). The research in this area has primarily used college students to evaluate the role of self-efficacy to career choices and academic achievement. Generally, the results have shown that self-efficacy beliefs contribute to career choice decisions (Lent, Brown, & Larkin, 1987); are predictive of
success and persistence in certain academic majors (Brown, Lent, & Larkin, 1989); and has proven effective in predicting academic success in college students (Siegal, Galassi, & Ware, 1985).

Self-efficacy theory also has been used in many health, medical, and exercise-related settings to understand why individuals make lifestyle choices that enhance or impair health. For example, Carey and Carey (1993) completed a longitudinal study of heavy smokers who tried to stop smoking on their own. They found that successful quitters had a stronger sense of self-efficacy than the relapsers and continuous smokers. A second domain of habit change research is the treatment of drug and alcohol abuse. Generally, the research in this area has indicated that individuals that have low levels of self-efficacy have a difficult time overcoming their addictive behavior after completion of treatment (Bandura, 1997; Schimmel, 1986).

Another domain of habit change that has been extensively studied is the relationship between self-efficacy and physical activity. Specifically, researchers in the sport psychology and exercise science fields have tried to identify the possible psychological factors that influence an individual’s decisions to adopt and continue participating in exercise and physical activity (Dishman, 1991). In the exercise adherence literature, the positive correlation relationship between self-efficacy and physical activity has been shown in healthy and diseased patients in a variety of populations including: the rehabilitation of coronary artery disease patients (Ewart, Stewart, Gillian, Keleman, 1986); gait adjustments in older adults (Rosengren, McAuley, & Mihalko, 1998); and behavioral intentions of novice exercisers (Rodgers, & Brawley, 1996).
The relationship between self-efficacy and physical activity has also been examined in middle-aged adults. For example, McAuley and his colleagues (1991, 1994) completed a series of studies that examined the effects of both long-term and acute bouts of exercise of middle-aged male and female adults. The findings of their original study showed that both males and females demonstrated significant increases in self-efficacy following acute and long-term bouts of exercise. In a later follow-up study, McAuley and his colleagues (1994) found that self-efficacy was a significant predictor of exercise attendance for both male and female participants. The findings also showed that the participants in the intervention group increased their intensity and duration of aerobic exercise as the study progressed.

A number of researchers have also attempted to identify the determinants of continued exercise participation for adults enrolled in university-based physical activity classes. Desharnais, Bouillon, and Godin (1986), for example, examined the role of self-efficacy and outcome expectations of 98 young college students enrolled in university physical fitness classes. The findings showed that self-efficacy was a more central determinant of adherence than expectations of outcomes, although both variables were significant cognitive predictors of adherence to exercise. Another study by McAuley, Wraith, and Duncan (1991) examined the relationship among self-efficacy, perceptions of success, and intrinsic motivation in students enrolled in university aerobic dance classes. Results indicated that participants who attended classes on a regular basis had high levels of self-efficacy, were intrinsically motivated, and reported that they had improved their general physical condition as a function of class participation (i.e., a perception of success).
In summary, a body of literature exists that has endeavored to understand some of the psychological factors that may help predict physical activity participation and long range adherence. Specifically, researchers have demonstrated that individuals that have high levels of self-efficacy are more physically active than people who do not have confidence in their abilities, physically and otherwise. What remains, and what is central to this dissertation research, is not only supporting the relationship between self-efficacy and exercise participation, but developing, implementing, and analyzing educational treatments that may be effective in altering both cognitive perceptions (e.g., self-efficacy) and daily behaviors (e.g., exercise participation and adherence).

Achievement Goal Orientation in Sport and Exercise Settings

Another related potential determinant of exercise participation and long range adherence may be the cognitive variable of achievement goal orientation. Related to self-efficacy in some degree, this variable speaks to an individual’s self-perceptions and perceived perceptions by others of their participation activity and relative ability within that participation activity. Much of the research on achievement motivation in sport and physical activity settings is based on the achievement goal research from the regular education and academic domains (Elliot & Dweck, 1988). In this line of research, theorists are concerned with the social, psychological, and behavioral outcomes associated with two goal perspectives, simplistically categorized into either a task-orientation or an ego-orientation (Duda, 1989). The achievement goal approach is based on the assumption that the two orientations are associated with how individuals define success or failure in an achievement context (Skaalvik, 1997). In an achievement-related setting, task oriented individuals perceive success and evaluate competence in terms of
their own effort and improvement. In contrast, ego-oriented individuals perceive success as a function of comparing their abilities in relation to others (Nicholls, 1989).

In the educational domain, a task orientation has been associated with learning, understanding, solving problems, and developing new skills for personal growth and intrinsic satisfaction (Duda and Nicholls, 1992). On the other hand, ego-oriented students are concerned with the belief that high ability is evidenced by out performing others, and hence, evaluate their relative self worth by how they perform in relation to other performers (Ames & Archer, 1988). The ego-orientation is also believed to be facilitated by a dominant focus on outside sources of recognition for achievement, rather than internal ones as described by the task orientation focus.

For example, achievement goals have been shown to affect the way students approach and perform their coursework (Dweck, & Leggett, 1988). Most of the research in this area supports a multiple goals perspective in which individuals may benefit from having a mastery and performance-based approach to learning (Harackiewicz, & Sansone, 1991; Pintrinch, & Garcia, 1991). In other words, striving to out perform others when coupled with a task mastery approach may have a positive effect on student learning and achievement (Ames & Archer, 1988). However, some of the research in this area points to the view that individuals who adopt an exclusive ego-orientation may be motivated to demonstrate superior ability to their peers when accomplished at a particular task, but may also tend to reduce effort and participation motivation to avoid negative reactions from others when the task is challenging or new (Slaalvik, Valas, & Sletta, 1994).

Additionally, Nicholls (1989) has suggested that the social context of a particular participation activity influences the type of achievement orientation selected by
individuals in a particular setting. For example, situations that promote social comparisons by emphasizing competition, focus on performance outcomes, and that promote social evaluation by significant adults and peers encourages adoption of an ego-orientation, even for individuals who prefer a dispositional task orientation. In contrast, situations that emphasize the importance of self-improvement, learning, and mastery of skill tend to elicit a task orientation to the activity.

A wealth of literature has supported the use of goal orientation as an effective model for studying motivation in academic, health, and sports settings. In summary, a task orientation has been demonstrated to be functionally related to enjoyment, satisfaction, striving for mastery, cooperation, increases in effort, and perceived competence (Boyd, & Yin, 1986; Duda, Fox, Biddle, & Armstrong, 1992; Williams, 1994). In contrast, individuals with an ego-orientation often associate perceived competence by comparing their abilities and performance with others (social comparison) and are interested primarily in their performance outcomes in relation to significant others rather than optimal individual development (Williams, 1994).

Social comparison theory, in this review subsumed under an ego-orientation to achievement goals, also suggests that humans have an innate drive to compare their abilities and skills with others (Festinger, 1954). Wood (1989), for example, concluded that social comparison of abilities can lead to self-improvement through learning from others with greater abilities or can be viewed as a means for self-enhancement to improve self-image (i.e., upward comparisons). Sometimes, however, people choose to compare themselves to others who have similar or inferior ability to protect or enhance their self-esteem. This is referred to as a downward comparison (Kilpatrick, Bartholomew, &
Riemer, 2003). In the exercise literature, research has demonstrated that upward and downward comparisons affect how individuals feel about themselves. For example, Fox and Corbin (1989) showed that in an exercise setting people often comparatively rate themselves on physical strength, aerobic fitness, and appearance in order to determine their general level of self-esteem through physical appraisal.

One’s appearance or what has been termed in the literature as self-presentational motives may also influence an individual’s desire and motivation to begin and maintain an exercise program. Leary (1992), for example, states that many people worry about their physical appearance in physical activity settings which sometimes leads to drop out behavior or lack of participation in physical activity settings all together. In addition, some individuals do not want to engage in exercise programs because of low skill levels and/or poor physical conditioning. For example individuals participating in a weight training class may discontinue the program if they believe they don’t have the necessary skills and competence to perform the exercises correctly, or they may be inhibited because of lack of muscular strength. These self-presentational concerns often present psychological barriers that may prevent individuals from having the motivation and self-confidence to start and maintain an exercise program.

Drawing from the academic literature, sports psychologists have investigated the impact of goal orientation in the study of behavior in athletic settings (Chi & Duda, 1995; Boyd & Yin, 1996) and in physical education classes (Duda & Ntoumanis, 2003). In sport, a task orientation has been found to be associated with positive sportsmanlike behaviors (Walling & Duda, & 1995); increased effort and enjoyment (Duda, Olson, & Templin, 1991); and more positive attitudes towards sport and exercise participation.
(Walling, & Duda, 1995). In contrast, an ego-orientation in sports and athletic settings has been associated with decreases in performance behavior (Chi & Duda, 1993) and increases in anxiety prior to sport competition (Hall & Kerr, 1997).

Further, in an athletic setting, Duda (1989) examined the relationship between a task or ego orientation and the perceived purpose of sports participation among high school athletes participating in various team and individual sports. Results of this study showed that a task orientation was positively related to the beliefs that sports should enhance self-efficacy, focus on effort and skill acquisition, and teach athletes cooperation and sportsmanship skills. On the other hand, an ego orientation was associated with social status and competitiveness. In summary, the findings revealed that high school athletes perceived reasons or values for participation in sport were predicted by whether the athlete focused on skill mastery and improvement (i.e., task orientation) or being better than others (i.e., ego-orientation).

The achievement goal theory also has been used as a theoretical framework to provide insight into the quality and quantity of motivation in physical education settings (Dweck, 1999) and used for learning about the purposes of participation in physical education and school sports (Nicholls, 1989). For example, Treasure and Roberts (1994) found that middle school students believed that success in sports was related to high effort and peer cooperation, while an ego-orientation was related to the belief that success was a result of high innate ability and other external factors.

Walling and Duda (1995) also found that high school physical education students that scored high in task orientation believed that success is achieved through intrinsic interest, effort, and cooperation. In contrast, students with high ego-orientation scores believed
that success in physical education is related to high ability more so than low ego-oriented students. In summary, the aforementioned studies agreed with much of the academic-based research that a task orientation in sports and physical education setting is the preferred motivational orientation for learning and performance enhancement compared to an ego orientation.

Achievement motivation research in sport has produced a wealth of literature in recent years. However, in exercise settings, only a handful of researchers have investigated the effects of achievement motives on such factors as participation rates and effort exerted during exercise. Markland and Ingledew (1997), for example, found that competition or what was defined as "because I like trying to win in physical activities" and social recognition were two of the most important predictors of adherence to exercise. The findings of Duda and Tappe (1989) in the exercise domain also included elements of competition that are conceptually in agreement with the belief that exercisers may be motivated to participate by ego-oriented goals.

In contrast, Boyd, Weinmann, and Yin (2002) investigated whether physical self-perceptions and goal orientations are associated with intrinsic motivation to exercise. Their findings showed that among female exercisers, a task orientation, perceived competence, interest, and enjoyment were associated with intrinsic motivation to adhere and maintain participation in structured exercise programs.

In summary, while a wealth of goal orientation research exists, additional empirical evidence is needed to identify whether individuals primarily adopt a task or ego-orientation or some combination of the two motivational perspectives when approaching and participating in structured physical activity. Additionally, little is known about the
relationship among goal orientation and tendency to participate and adhere in a structured exercise program. This dissertation was structured to add to the literature in these last regards.

Preferred Methodologies

This section provides summary of two methods for data collection and analysis. Each was viewed as compatible with the relevant components of the dissertation research as described in Chapter 2 of this document.

Qualitative Research Methodology

In this subsection an overview of self-report and survey research is provided as this was the predominant method used in Study 1, and portions of Study 2, as contained in Chapter 2 of this dissertation.

Currently, a wide and varied set of methodologies exists in relation to qualitative research paradigms. The following excerpt from Sharpe and Koperwas (2003, pp. 25-26) provides overview:

Most qualitative research stems from the field of cultural anthropology. In this method, the research setting is a catalyst for stimulating interest in the researcher in inductive ways. The researcher is an active participant and an integral part of the study. The focus has typically been upon the relationships between the environmental events that occur within natural settings and relevant participant responses. A rigorous set of scientific procedures has been developed to collect and analyze narrative descriptions of a variety of natural settings. A similar set of procedures has also been developed to collect and analyze various types of interview responses designed to gain insight into the participant perspectives and cognitions believed to be operating within those settings (see LeCompte & Preissle, 1993 and Miles & Huberman, 1984 for a detailed discussion of such methodological procedures). This research category provides a potentially inclusive description of behavior-environment events, and potentially provides data related to thinking and mind, getting at what many behavior analysts term private events or covert behavior.

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Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
A lot of confusion, however, surrounds those who discuss qualitative research, in that it has often been regarded as if it were one approach (Lutz & Ramsey, 1974; Magoon, 1977; Rist, 1977; Smith, 1983; Wilson, 1977). Jacob (1988) and Smith (1987) provide detailed discussion of qualitative research methods across a broad classification of types and strategies and into the general areas of: (a) human ethology, (b) ecological psychology, (c) holistic ethnography, (d) cognitive anthropology, (e) ethnography of communication, and (f) symbolic interactionism. Important to this discussion is that the central theme of all of these qualitative strategies is participant observation of as many behavioral and setting variables of interest as possible. The desired database for all of these strategies is a synthesis of extensive narrative fieldnotes. For qualitative methods, however, participant observation may be, at the same time, a primary advantage and a major shortcoming. Due to the strategy of narrative synthesis with a single case or small group, qualitative research involves a highly reductive data analysis based in large part on researcher intuition, with conclusions couched within the inherently value-laden perspectives of the researcher and the study participants. In other words, the final data analysis is in large part dependent on the subjective way in which certain data are gathered and used while other data are overlooked or discarded during the data synthesis process. Although qualitative methods may provide important insight into the form and character of an experimental setting, direction regarding what should be studied, and participant (or social) validation of the researcher's perspective on a particular treatment, the nature of the data collection and analysis process makes it inherently difficult to distinguish cause from effect, with overall experimental coherence becoming a challenging determination. The main weakness of this method, therefore, lies in the need for grounding the descriptive narrative data collection efforts in research techniques that can provide a more objective means of data analysis. In essence, the qualitative descriptive details from which the intuitive conclusions of the researcher stem are in need of criteria for consistent data interpretation across studies.

Specific to this dissertation, self-report and survey research are currently popular methods for collecting descriptive information about the characteristics of a population or group of interest. In the psychological and exercise science fields, the distribution of surveys have been used to investigate a wide range of motivational and health-related problems including the psychological factors that influence eating behavior patterns (Shannon, Bagby, Wang, & Trenkner, 1990); relapse in smoking cessation programs.
(Condiotte, & Lichtenstein, 1981); and to describe the outcomes of, and barriers to, habitual physical activity (Steinhardt, & Dishman, 1989). In illustration based on the studies referenced above, questionnaires and self-report instruments (e.g., The Smoking Cessation Pretreatment Confidence Questionnaire, Seven-Day Recall of Physical Activity Questionnaire) are formally given to study participants and data are organized for analysis with intent to provide descriptive and predictive information based on study participant perceptions of particular phenomena and study participant activities in relation to the problem being studied.

As detailed within Chapter 2, in this dissertation study a questionnaire with open and closed-ended questions (Demographic Exercise Adherence Questionnaire for Physical Activity) and two Likert scale instruments (SEPA and AGOPA) were administered to the participants at specified times during the study. The Demographic Exercise Adherence questions provided the researcher with general demographic information about the participants, as well as solicitation of information relevant to the research questions posed in relation to exercise history and experience. The Self-Efficacy and Achievement Goal Orientation questionnaires (see Appendix C and D), asked study participants to rate themselves on questions related to their physical self-efficacy, confidence, and motivational approach towards exercise. Specifically, the questionnaires used in this dissertation study were administered to determine any meaningful or significant correlations that exist among exercise adherence, self-efficacy, and goal orientations (see Data Analyses section in Study I), essentially using one of the many qualitative methods approaches to performing research.
Mixed Method Research Designs

In Study II of this dissertation, a mixed method design was employed to determine the possible changes in self-efficacy and achievement goal orientation as a function of treatment exposure (i.e., instructor-set goals/modeling, public posting, and peer-feedback). In the educational and social sciences, a small minority of researchers have begun using both qualitative and quantitative methods when conducting research into particular applied phenomena. Mixed methods usage is predicated on a compatibility theory or what is often termed mixed method research (Johnson & Christensen, 2004).

One of the advantages of using a mixed method design is that the strengths of both quantitative and qualitative methods can be implemented in concert to uncover more of the form and character of the applied phenomena to be studied. Traditionally, many educational and social science researchers typically used either a quantitative or qualitative approach exclusively, but now researchers are discovering that using multiple research methods often provides more information than strictly relying on one method or another. A second advantage of mixed methods applications is that researchers are not confined or limited to one method of research which provides the opportunity to investigate a broader range of questions (Johnson & Onwuegbuzie, 2004).

Behavior analysis has historically been included in the quantitative methodology category due to its reliance on numerical data. Though traditionally very separate methodologies, behavior analysis and qualitative approaches to data gathering exhibit many similarities and may therefore be amenable to a mixed methods approach to research activity. A number of researchers now believe that the incompatibility between the qualitative and quantitative methods does not exist and the decision to implement a
mixed method approach should be based on the research questions to be answered (Howe, 1988; Newman, 1992; Sharpe & Koperwas, 2003).

**Applied Behavior Analysis**

In this subsection an overview of applied behavior analysis as a research methodology is provided in the context of some of the important findings of this method in relation to the treatments used in this dissertation research (refer to the Study 2 section of Chapter 2).

Current practices in the experimental and applied analysis of behavior can be attributed primarily to the work of B.F. Skinner (1938). Skinner introduced and substantiated the use of a three term contingency (i.e., Stimulus → Response → Consequence) model and developed a set of principles and procedures that provide the foundation for today’s behavior analysis research (e.g., reinforcement, punishment, stimulus discrimination, etc.).

Research using behavior analysis methods generally fall under three categories or methodologies (Morris, 1992). The first category is the experimental analysis of behavior in which studies are conducted in controlled laboratory settings. The second category is the applied analysis of behavior in which experiments are conducted in educational, clinical, and sports settings to increase performance or change behavior for therapeutic benefits. The final category, termed the conceptual analysis of behavior provides theoretical and philosophical support for experimental and applied behavior analysis investigations. In all three categories, researchers have produced important findings related to prediction and control principles in laboratory settings and specific therapeutic
practices in applied professional contexts (Baer, Wolf, & Risley, 1968; Sharpe & Koperwas, 2003)

Applied behavior analysis is a field of study that relies on repeated measurement of a small number of subjects (i.e., individuals) or unit (e.g., educational classrooms) to assess the efficacy of specific treatments or interventions (Poling & Grosett, 1986). More specifically, applied behavior analysis designs focus on the application of operant and respondent principles to improve human conditions or change behavior in the near and long term (Pierce & Cheney, 2004; Sharpe & Koperwas, 2003). For example, principles of behavior change have been used to help individuals stop using drugs (Higgins & Katz, 1998); reduce phobic behavior (Jones & Friman, 1999); evaluate and treat psychiatric disorders (Kazdin, 1982); improve general academic instructional practices (Kamps, Leonard, Dugan, Boland, & Greenwood, 1991); and improve social behavior in physical education classes (Sharpe, Crider, Vyhidal, & Brown, 1996).

Within these literatures, behavior analysis interventions have also proven successful in enhancing performance and exercise participation in healthy and clinical adult populations (Martin & Dubbert, 1982). Among the behavioral strategies that appear effective in producing change in exercise adherence patterns are goal setting (Martin et. al, 1984) and contingency management interventions (Allen & Iwata, 1984). Of additional potential appeal, though mainly supported in the physical education teacher preparation literature, is the use of feedback as a mechanism for changing behavior patterns in physical education and structured activity settings (Sharpe, Balderson, & So, 2004).
In the sport and physical education literature, many applied behavior analysis designs have been used to remediate behavior or improve performance. For example, a sportsmanship curriculum intervention has been used to improve social behavior in elementary students (Sharpe, Brown, & Crider, 1995); peer instruction has increased athletic performance on the football field (Ward, & Carnes, 2002); and a public posting intervention has been demonstrated to improve inappropriate on-court behavior in collegiate tennis players (Galvin, & Ward, 1998). Single-subject designs have also been used for enhancing the performance of athletes and coaches including: increasing the frequency and quality of feedback provided by youth baseball coaches (McKenzie & King, 1982); implementing self-management strategies for improving gymnastic performance (Wolko, Hrycaiko, & Martin, 1993); and using relaxation and self-talk strategies in youth hockey players (Rogerson & Hrycaiko, 2002). The overall results of the aforementioned studies have demonstrated that implementing applied behavior analysis strategies provide incentive and motivation to change behavior and enhance performance.

Specific to this dissertation research, a limited number of studies in the exercise literature have demonstrated applied behavior analysis methods to document effective motivational strategies for short and long term exercise adherence. For example, a combined goal-setting/feedback and contingent reinforcement strategy was used to increase aerobic exercise participation in nursing home residents (Perkins, Rapp, Carlson, & Wallace, 1986). A behavior analysis strategy was also demonstrated effective in increasing exercise adherence in obese children (Epstein, Koeske, & Wing, 1984). The studies just mentioned have provided a good starting point, however – and germane to
this dissertation research --, much remains to the thoroughgoing documentation and analysis of known effective applied behavior analysis strategies in relation to improving exercise participation and long term exercise adherence.

Dissertation Treatment Literature

This section provides overview in support of the three known effective behavior analytic treatments chosen by this dissertation research to improve on an intact population's exercise adherence behaviors. They include goal setting, public posting, and peer feedback strategies.

Goal-Setting in Sport and Physical Activity

One of the most popular motivational strategies for improving performance in the organizational, industrial, and sport domains is the overt setting of goals and objectives in specific relation to the task to be accomplished or skill to be learned. Early research in the organizational and industrial fields showed that goal-setting enhanced productivity and performance in many business and management settings (Locke, & Latham, 1990; Mento, Steel, & Karren, 1987). As mentioned above, such consistent findings from the organizational and industrial literature have led many coaches, athletes, and physical educators to improve performance by establishing specific goals and objectives for athletes in a variety of physical activity and athletic settings (Harrison, Blakemore, Buck, & Pellett, 1996; Rink, 1993; Weinberg, Butt, & Knight, 2001). The goal-setting research in sport and exercise settings initially involved examining variables such as goal difficulty, proximity, and specificity (Swain & Jones, 1995; Weinberg, Stitcher, & Richardson, 1994). Findings from this early research point conclusively to the importance of (a) stipulating goals and objectives regularly, (b) having caregivers – in this case
teachers and coaches – be consistently in close proximity to reinforce goals and objectives, and (c) having caregivers ensure that the goals and objectives specified were at an appropriate level of difficulty for the clientele to be served; that is at a challenging albeit conducive to achievement difficulty level.

More recently, goal-setting research in sport has investigated the effectiveness of different types of goal conditions on athletic performance. For example, Boyce, Wayda, Johnston, and Bunker (2001) investigated the effect of self-set, instructor-set, and do your best (i.e., experimental control) goals on tennis serving performance in college age students enrolled in beginning tennis classes. The results showed that self-set and instructor-set goal groups made significantly greater improvements in their tennis serving performance compared to the do your best control group that was taught and practiced in the absence of specified goals or objectives.

In the applied behavior analysis literature, goal-setting strategies have been shown to improve the practice teaching experiences of students enrolled in teacher education programs (Ingham & Greer, 1992; Sharpe, So, Mavi, & Brown, 2002) and have served to enhance athletic performance (Hume & Crossman, 1992; Lerner, Ostrow, Yura, & Etzel, 1996). Swain and Jones (1995), for example, investigated the effects of a goal-setting intervention on basketball skill improvement in four elite college basketball players over the course of a competitive season. The goal-setting intervention required the participants to generate numerical targets or goals for improvement in various basketball skills (e.g., turnovers, rebounds). The findings showed that three of the four participants showed consistent improvements in performance by the end of the season as a function of specific goal exposure.
Only a few studies have used goal-setting as a motivational strategy in the exercise domain, however. For example, Martin, Dubbert, Katell, Thompson, Razynski, Lake, Smith, Webster, Sikora, and Cohen (1984) found that long-term goals led to better attendance for participants enrolled in a structured physical activity class than short-term goals or no goals. Another study conducted by Annesi (2002) implemented a goal-setting protocol in men and women who were members of a modern, well-equipped fitness facility. The findings showed that the goal-setting group had a significantly lower dropout rate (goal-setting 30%, control group 70%) and better attendance than the control group over the course of the 52-week study.

Public Posting

Another potentially effective strategy for increasing motivation to participate in and adhere to instructional settings is public posting. Public posting in academic and sports domains has generally involved a publicly displayed record of performance for all participants to view and review on a regular basis before and after a participation activity, such as the posting of meeting or performing above a targeted goal (e.g., tackles in football) to recognize outstanding achievement in the classroom and in practice and competitive sports settings. In a range of academic, medical, sports and physical education settings public posting has been demonstrated to increase positive social behaviors (Brantley & Webster, 1993), improve student academic performance (Wolfe, et, al. 2000), improve reading performance (Van Houten & Lai Fatt, 1981), decrease inappropriate behavior in elementary students (Holland & McLaughlin, 1982), and decrease disruptive behavior in high school students (Jones & Van Houten, 1985).
Specific to structured physical activity settings, Ward, Smith, Makasci, and Crouch (1998) investigated the effects of public posting on task accomplishment in elementary physical education students. The students were required to record the number of attempts at a basketball lay-up, and the number of made baskets within a specified time period. The totals were posted on the gymnasium wall for others to see. The findings showed that both the low and average skilled players increased the number of attempts made and that the public posting intervention also had a positive effect on the number of baskets made (i.e., successful skill attempts) by the average players.

Public posting of student performance has also been scientifically supported as effectively holding students accountable for a given task (Lund, 1992). It has also been suggested that public posting is an effective behavioral technique because students receive recognition for achievement in front of their peers (Ward, Smith, & Sharpe, 1997). In sport, public posting has often been used as a combined behavioral technique with goal setting to provide athletes with incentive and motivation to improve performance (Martin, et. al, 1997). For example, Ward, Smith, and Sharpe (1997) investigated the effects of a public posting strategy on holding collegiate football players accountable for performance in practice. The results showed that during the posting phase of the experiment, the athletes met or exceeded previously set goals, and when the posting treatment was withdrawn, the experimental participants tended to return to previous and less effective levels of skill performance.

Another study by Brobst and Ward (2002) evaluated the effects of public posting, goal setting, and verbal feedback on the performance of female high school soccer players during practice scrimmages. Target behaviors for this study included the
percentage of correct responses when the player maintained possession of ball, moved to open position after passing the ball, and moved to an open position on the field after a restart (e.g., goal, corner kick, throw in). Overall, the findings showed that public posting improved all of the players’ soccer skills during practice scrimmages for the three targeted sport skills.

Peer-Feedback Strategies

Another potentially appealing behavior analytic strategy, generally termed peer-feedback and including a variety of peer-mediated approaches to instruction, has also been shown to be effective in increasing student learning in a wide range of educational settings. Research using peer-mediated interventions has demonstrated increases in academic performance, student engagement, on-task behaviors, and time management across a wide range of instructional settings (DePaul & Henningson, 1993; Greenwood, Delquadri, & Hall, 1989; Greenwood, Dinwiddle, Terry, Wade, Stanley, Thibedeau, & Delquadri, 1984). Using peer-mediated instruction, the teacher’s role changes from active primary instruction to monitoring and improving peer-teaching activities (Utley, Mortweet, & Greenwood, 1997). Compared to traditional styles of teaching (e.g., direct instruction), peer mediated approaches, or those approaches whereby the student peer is the primary instructional purveyor, have been documented to (a) increase error detection, (b) facilitate immediate feedback and error correction, and (c) increase levels of encouragement during skill practice activities (Greenwood & Delquadri, 1985). Finally, peer mediated approaches have been proven effective in the motivational arena. In other words, when using this approach to instruction it has been demonstrated that students
tend to motivate their peers to contribute their best performance (Greenwood et al., 1984).

In the special education literature, for example, Greenwood and his colleagues (1989, 1994, 1996) have completed a series of studies using a Class-Wide Peer Tutoring System (CWPT). CWPT was developed as an alternative to traditional forms of teaching by requiring students to work in pairs by tutoring each other on academic material including verbal and written practice of skills (e.g., writing, spelling words, reading aloud, math facts; Utley, Reddy, Delquadri, Greenwood, Mortweet, & Bowman, 2001). The CWPT program was shown to increase opportunities for students to practice academic-related tasks and required students to be actively involved in making academic responses rather than passively listening to instruction (Delquadri, Greenwood, Stretton, & Hall, 1983). As a teaching strategy, CWPT has proven effective in increasing the academic performance of students with disabilities in many academic subjects such as spelling (Harper, Mallette, Maheady, Parkes, & Moore, 1993); second-language acquisition (Arreaga-Mayer, 1998b); and reading and math (Greenwood, Delquadri, & Carta, 1996).

In another example from the In the special education literature, Utley and her colleagues (2001) investigated the effectiveness of using a CWPT system with five developmentally disabled students who were being taught health and safety facts. Specifically, study participants learned the name of body parts, body functions, poisons, dangerous situations, and understood the importance of not taking drugs. The results showed consistent increases in performance using a CWPT instructional method when compared to more traditional teaching methods. In summary, the research using CWPT procedures have increased academic engagement and student retention in a variety of
diverse student populations and have been shown to be an effective alternative to traditional forms of instruction.

Similar to the CWPT approaches just summarized, peer-mediated approaches to instruction have also been implemented in physical education settings. For example, Crouch, Ward, and Patrick (1997) used a peer-mediated intervention as a reinforcement strategy to increase performance in elementary physical education students. They found that when students received peer-mediated reinforcement, they had higher performance than those students who were not exposed to the intervention. Johnson and Ward (2001) also used a classwide peer-tutoring (CWPT-PE) intervention during a striking unit in a 3rd grade elementary physical education class. The results showed that CWPT increased the number and percentage of correct trials on many of the 39 striking tasks performed over a 20 lesson unit compared to baseline levels.

Summary

This Appendix has provided a closer look at the relevant literature for this dissertation study. The first section focused on the challenges associated with adherence and participation in structured physical activity programs. This section also highlighted the ongoing problems associated with the increases in obesity and health-related problems associated with sedentary behavior and lack of physical activity. The next sections of this Appendix summarized the self-efficacy, exercise adherence, and achievement goal orientation research, in general, and within sport and exercise settings. The third section of this Appendix provided an overview of the scientific methods used in this dissertation research, beginning with qualitative self-report and survey methods, and ending with summary of the experimental and applied behavior analysis literature. Within each of
these sections, some of the more salient findings from each method were illustrated in
demonstrating their potential applicability to this dissertation activity. The final section
summarized literature related to the three experimental treatments contained in this
dissertation research, including subsections devoted to goal-setting, public posting, and
peer-feedback strategies that may be of potential benefit when promoting exercise
participation and long range adherence.

In general, it is hoped that this dissertation research will add to the existing exercise
adherence literature by first correlating personality type to propensity to participate in
exercise programming, and by second documenting potentially effective strategies that
address the challenges associated with facilitating increases in sedentary and non-
participation behavior with respect to regular physical activity. Additionally, and while
the existing psychological literature has provided evidence of some of the motivational
factors that predict adherence levels with relative success, this dissertation research may
provide additional empirical support for the implementation of specific behavioral
strategies that act to functionally increase self-efficacy, and encourage task orientation;
both of which have been documented as potentially connected with more effective
individual exercise adherence behavior. Specifically, this dissertation research was
designed to provide descriptive information about the potential relationships among self-
efficacy, achievement goal orientations, and exercise adherence patterns for participants
enrolled in university structured physical activity classes. Equally important to this
dissertation research is the attempt to empirically change exercise participation and
adherence patterns and functionally change self-efficacy and goal orientation
perspectives of those exercise participants. The findings from this dissertation study may,
therefore, provide the medical, health and fitness, and structured recreational communities with a greater understanding of the impact of psychological factors on exercise adherence and more importantly, provide practitioners and professionals in the field with a set of recommended strategies to encourage long term participation and adherence to structured physical activity.
APPENDIX B

DEMOGRAPHIC AND EXERCISE ADHERENCE QUESTIONNAIRE

General Instructions: Please fill out this form as completely as possible. If you have any questions, please ask the instructor for assistance.

1. Have you, and if so, how long have you been exercising regularly (regularly is defined as a minimum of 3 times per week for a minimum of 35 mins)?
   Yes ___ No ___ If yes, presently? ______ how many months/ yrs ______ (1 pt)
   If yes, not presently? ______ previous months/ yrs ______ (1/2 pt)

2. Are you currently involved in regular anaerobic (weight training) activity? If so, how long have you been weight training regularly (regularly is defined as a minimum of 2 times per week for a minimum of 45 mins)?
   Yes ____ No ___ If yes, how many days per week ______ (1 pt)
   (1/4 pt for 3 or more)

3. In the past two years, have you participated in a formal weight training program?
   None ___ < 6 months ___ 6 months to a year ___ > one year ___
   (1/2 pt) (3/4 pt) (1 pt)

4. Are you currently involved in regular aerobic activity (i.e., running, walking, swimming)?
   Yes ___ No ___ If yes, how many days per week ______ (1 pt)
   (1/4 pt for 3 or more)

5. Are you a full _______ or part _______ time student?

   Freshman ___ Sophomore ___ Junior ___ Senior ___ Graduate Student ___

AGE ___ Gender (M or F) _______ Ethnicity _______

Note. Points in parentheses indicate scaling for Likert type data conversion for statistical comparison analysis purposes.
APPENDIX C

SELF-EFFICACY SCALE FOR PHYSICAL APPEARANCE (SEPA)

Directions: Please circle the answer that best represents your feelings about each statement related to exercise and physical activity participation. All responses will remain anonymous and confidential per the Human Subjects Research approval description for this project. All information is intended to learn more about how the physical activity course(s) that you participate in may be more effectively offered.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Moderately Agree</th>
<th>No Preference</th>
<th>Moderately Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

1) My physique is rather strong.

   1  2  3  4  5

2) I have physical defects that sometimes bother me.

   1  2  3  4  5

3) I am not hesitant about disagreeing with people bigger than me.

   1  2  3  4  5

4) I have poor muscle tone.

   1  2  3  4  5

5) I take little pride in my physical abilities.

   1  2  3  4  5

6) I am sometimes envious of people better looking than myself.

   1  2  3  4  5

7) Physically fit people usually do not receive more attention than me.

   1  2  3  4  5

8) I am not concerned with the impression my physique makes on others.

   1  2  3  4  5

9) I do not feel in control in exercise settings.

   1  2  3  4  5

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10) Because of my physical fitness, I have been able to do things that others could not do.

1  2  3  4  5

Note: The Self-Efficacy Scale for Physical Activity is a modified version of the Physical Self-Efficacy Scale and its subscales: the Perceived Physical Ability and the Physical Self-Presentational Confidence Scales (Rychman, Robbins, Thorton, & Cantrall, 1982). The development of SEPA involved the revision of wording items that were more appropriate for exercise rather than sports participation.
APPENDIX D

ACHIEVEMENT GOAL ORIENTATION SCALE FOR PHYSICAL ACTIVITY (AGOPA)

Directions: Please circle the answer that best represents your feelings about each statement related to exercise and physical activity participation. All responses will remain anonymous and confidential per the Human Subjects Research approval description for this project. All information is intended to learn more about how the physical activity course(s) that you participate in may be more effectively offered.

Strongly Agree  Moderately Agree  No Preference  Moderately Disagree  Strongly Disagree

11) I learn a new skill or exercise and it makes me want to work out more frequently.
   1  2  3  4  5

12) I can improve my physique faster than my friends.
   1  2  3  4  5

13) Others can’t do as well as me.
   1  2  3  4  5

14) I learn something that is fun to do.
   1  2  3  4  5

15) I learn a new skill by trying hard.
   1  2  3  4  5

16) I work really hard to learn new skills.
   1  2  3  4  5

17) Others have a hard time learning new exercises and I don’t.
   1  2  3  4  5

18) Learning new exercises or routines makes me want to go out and exercise more.
   1  2  3  4  5
19) I'm the best at skill performance.

1  2  3  4  5

20) I work out at a higher intensity than others.

1  2  3  4  5

*Note:* This scale is a modified version of the Task and Ego Orientation in Sport Questionnaire (Duda, 1989b). The development of an exercise version of the AGOPA scale involved changing only words that would be more appropriate for adult exercise settings rather than youth sports participation.
NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: September 14, 2005
TO: Dr. Tom Bean, Curriculum & Instruction
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. Michael Stitt, Chair
Protocol Title: Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations and Exercise Adherence in Sedentary and Moderately Active Adults
Protocol #: 0508-1684

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45 CFR 46. The protocol has been reviewed and approved.

The protocol is approved for a period of one year from the date of IRB approval. The expiration date of this protocol is September 14, 2006. Work on the project may begin as soon as you receive written notification from the Office for the Protection of Research Subjects (OPRS).

PLEASE NOTE:
Attached to this approval notice is the official Informed Consent/Assent (IC/IA) Form for this study. The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

Should there be any change to the protocol, it will be necessary to submit a Modification Form through OPRS. No changes may be made to the existing protocol until modifications have been approved by the IRB.

Should the use of human subjects described in this protocol continue beyond September 14, 2006, it would be necessary to submit a Continuing Review Request Form 60 days before the expiration date.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@ccmail.nevada.edu or call 895-2794.
September 27, 2005

Matthew Martin
C&I 5330

Thank you for submitting your research protocol and approval information for the protocol titled, *Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations and Exercise Adherence in Sedentary and Moderately Active Adults*, which was approved by the University of Nevada Las Vegas IRB on September 14, 2005. The Illinois State IRB will maintain this documentation for our records, however if any changes or modifications are made to this research project or any adverse reaction reported, you are responsible for reporting these immediately to the Research Ethics and Compliance Office.

This letter in no way grants you access to any faculty, staff, students and/or facility at Illinois State. Access must be secured, by you, through the appropriate institutional units. If you have any further questions regarding this issue, please feel free to contact me. Sincerely,

Bruce Deason
Assistant Director of Research

cc Tom Bean
UNLV
INSTRUCTOR INFORMED CONSENT

Title of Study:
Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations, and Exercise Adherence in Sedentary and Moderately Active Adults.

Investigators
Tom Bean, Ph.D., Full Professor
Matt Martin, M.S., Ph.D. Candidate

Protocol Number – 0508-1684

Purpose of the Study
You are being invited to participate in a research study. The purpose of this study is to gather descriptive information concerning psychological characteristics of self-efficacy and achievement goal orientation as it relates to exercise adherence behavior. A second purpose of this research examines how known behavior analytic interventions of instructor-set goals, public posting, and peer-feedback might affect participant exercise adherence behavior. If you agree, the questionnaire and behavioral data we collect for the purposes of describing the effective procedures you use in your undergraduate physical activity classes will be collected and described anonymously to others to provide a database in support of effective motivational and instructional strategies. The data collected will be stored in hard copy form, and in a secure cabinet until the end of the study. The data will then be stored in a locked cabinet for 3 years, after which time all data will be destroyed. Only the principal and student investigator of this study and as named above will review the data collected. In addition, the data will be shown to you in an effort to make you more familiar with your teaching practices and in the hopes of helping you become an even more effective teacher.

Participants
You are being asked to participate in the study because you are an instructor at Illinois State University.

Procedures
If you volunteer to participate in this study, you will be asked to do the following: The study will consist of observing your class two times per week. The duration of the study will be approximately 16 weeks. Within this study, the primary instructor will be asked to (a) administer three questionnaires at four specified intervals during the course of this study and (b) collect attendance and exercise activity during class time and (c) implement three behavioral strategies (i.e., instructor-set goals, public posting, and peer-feedback).
Title of Study:
Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations, and Exercise Adherence in Sedentary and Moderately Active Adults.

Investigators
Tom Bean, Ph.D., Full Professor
Matt Martin, M.S., Ph.D. Candidate

Protocol Number - 0508-1684

Benefits of Participation
There may be no direct benefits to you as a participant in this study. However, we hope to learn more in the areas of: (a) documenting effective instructional and motivational practices, (b) providing case material with which to educate future exercise and fitness professionals, and (c) providing information to other instructors that are interested in the specific strategies to increase exercise adherence and motivation.

Risks of Participation
There are risks involved in all research studies. This study, however, includes only minimal risks due to the purely descriptive and empirical in nature of data collection on an ongoing set of instructional practices in your classroom setting.

Cost/Compensation
There will be no financial cost for you to participate in this study. The only additional time the study will require is the administration of four questionnaires which takes approximately five minutes per survey for the study participants to complete.

Contact Information
If you have any questions or concerns about the study, you may contact Dr. Tom Bean at (702) 895-1455 or Matt Martin (309) 661-8656

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office for the Protection of Human Subjects at (702) 895-2794.

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.
Title of Study:
Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations, and Exercise Adherence in Sedentary and Moderately Active Adults.

Investigators
Tom Bean, Ph.D., Full Professor
Matt Martin, M.S., Ph.D. Candidate

Protocol Number – 0508-1684

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All data will be stored in a locked facility at UNLV during the study and for three years after the study is completed. The data will be destroyed after the three year time period.

Participant Consent:
I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

Signature __________________________ Date ____________

Participant Name (Please Print) __________________________

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Title of Study  
Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations, and Exercise Adherence in Sedentary and Moderately Active Adults.

Investigators  
Tom Bean, Ph.D, Full Professor  
Matt Martin, M.S., Ph.D. Candidate

Protocol Number: 0508-1684

Purpose of the Study  
As a student in your physical activity class, you are invited to participate in a study that describes some of the psychological and motivational variables related to exercise participation and effort exerted during class time. In addition, we will implement some motivational strategies to encourage class attendance and active participation. All of this information will be used to try to help your instructor become more effective and encourage you to attend class on a regular basis. All information will be kept in complete confidence and not shown to anyone other than those of us who are describing your teacher’s activities.

Participants  
You are being asked to participate in the study because you are a student enrolled in an university physical activity course.

Procedures  
If you volunteer to participate in this study, you will be asked to fill out three questionnaires at four specified points throughout the semester and record your exercise activity on a fitness log sheet.

Benefits of Participation  
There may be no direct benefits for you as a participant in this study. However, we hope to learn more about effective instructional and motivational strategies.

Risks of Participation  
There are risks involved in all research studies. This study, however, includes only minimal risks due to observing you in your regular classroom environment. When you complete the survey you may feel uncomfortable when answering some of the questions. This risk is reduced because you do not need to put your name on it and the questions are simply asking your impressions of the activities.
Title of Study
Analysis of One Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations, and Exercise Adherence in Sedentary and Moderately Active Adults.

Investigators
Tom Bean, Ph.D, Full Professor
Matt Martin, M.S., Ph.D. Candidate

Protocol Number : 0508-1684

Cost/Compensation
There will be no financial cost for you to participate in this study. The only additional time the study will require is completing the survey which will take approximately five minutes on four separate occasions.

Contact Information
If you have any questions or concerns about the study, you may contact Dr. Tom Bean at (702) 895-1455 or Matt Martin at (309)438-8661.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office for the Protection of Human Subjects at 895-2794.

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All data will be stored in a locked facility at University of Nevada-Las Vegas during the study and for three years after the study completion. The data will be destroyed after the three year time period.

Participant Consent:
I am at least 18 years of age and I have read the above information and agree to participate in this study. A copy of this form has been given to me.

Signature ____________________________ Date ______________

Participant Name (Please Print) ____________________________
VITA
Graduate College
University of Nevada, Las Vegas

Matthew R. Martin

Home Address:
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Degrees:
Bachelor of Science, Business, 1992
California State University, Sacramento

Master of Science, Kinesiology, 2000
California State University, Hayward

Publications:

Dissertation Title: Analysis of One Structured Fitness Motivation Intervention on Self-Efficacy, Achievement Goal Orientations and Exercise Adherence in Sedentary and Moderately Active Adults

Dissertation Examination Committee:
Chairperson, Dr. Tom Bean, Ph.D.
Committee Member, Dr. Thomas L. Sharpe, Ed.D.
Committee Member, Dr. Sandra O'dell, Ph.D.
Committee Member, Dr. Timothy Bungum, Ph.D.
Committee Member, Dr. Porter Troutman, Ph.D.