THE SWAN EXERCISE EXPECTANCY MEASURE (SEEM) IN A COMMUNITY SAMPLE: VALIDATION AND MODERATING VARIABLES

Natasha Swan

A dissertation submitted in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy

Department of Psychology

Central Michigan University
Mount Pleasant, Michigan
May 2011

Accepted by the Faculty of the College of Graduate Studies,

Central Michigan University, in partial fulfillment of

the requirements for the doctoral degree

Dissertation Committee:

Donna Wollerman Ronan, Ph.D.	Committee Chair
Debra Poole, Ph.D.	Faculty Member
George Ronan, Ph.D.	Faculty Member
Kyunghee Han, Ph.D.	Faculty Member
May 4, 2012	Date of Defense
Roger Coles, Ed.D.	Dean College of Graduate Studies
August 8, 2012	Approved by the College of Graduate Studies

I dedicate this dissertation to my family and close friends. Thank you for the patience, encouragement, and support that you have provided for me as I follow my calling.

ACKNOWLEDGEMENTS

I wish to thank the members of my Dissertation Committee: Dr. Donna Wollerman Ronan, Dr. Debra Poole, Dr. Kyunghee Han, and Dr. George Ronan. These faculty members provided valuable direction during the planning and completion of this project. Throughout the process their support, encouragement, and advice helped motivate me to meet my potential.

ABSTRACT

THE SWAN EXERCISE EXPECTANCY MEASURE (SEEM) IN A COMMUNITY SAMPLE: VALIDATION AND MODERATING VARIABLES

by Natasha Swan

Our bodies are designed to be physically active. Many Americans, however, do not meet these exercise needs, resulting in a costly, national health crisis. The present study sought to improve the conceptualization and measurement of physical activity outcome expectancies (i.e., anticipated consequences) and examine the exercise habits (current and past) of young adults in the general population with an internet survey. The Swan Exercise Expectancy Measure (SEEM), a measure of young adults' PA outcome expectancies, is comprised of a four-factor structure that measures (a) positive, (b) negative, (c) social, and (d) practical outcome expectancies.

Confirmatory factor analysis results in the community sample of young adults suggestd good model fit of the SEEM, and convergent validity was supported with a strong positive correlation with current physical activity (r = .51, p <.001). Additional analyses advanced the conceptualization of outcome expectancies by identifying a more parsimonious second-order model for the SEEM. Finally, examination of the moderating effects of exercise experience yielded interesting, but nonsignificant, results.

In conclusion, this project advances the conceptualization of physical activity outcome expectancies for a community population and supports the validity and effectiveness of the SEEM for future research and clinical application.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

CHAPTER I

INTRODUCTION

Lack of activity destroys the good condition of every human being, while movement and methodical physical exercise save it and preserve it. ~Plato

The human body is designed for movement and physical activity. It has long been recognized that physical exercise contributes to physical and mental well-being. Historically, for our hunting-gathering ancestors, exercise was a mandatory part of daily life that was required for travel, protection, and to procure food (U.S. Department of Health and Human Services, 1996). In addition, physical activity was also enjoyed as an expression of religious, social, and cultural traditions, making it an integral part of many aspects of life. Physical activity, therefore, was as habitual as any other physical behavior and it enabled individuals to naturally maintain the balance between energy consumption and expenditure (Chakravarthy & Booth, 2004). It is argued that today's modern, sedentary lifestyles interfere with our genetically programmed activity needs, thus contributing to high rates of metabolic disorders.

According to Neel's (1962) "thrifty gene" theory, gene selection has favored a genotype that efficiently stores and uses energy. In the past, our metabolic cycles adapted to accommodate, and even thrive, in alternating times of feast-famine and physical activity-rest. Our present day environment is drastically different, however, with high caloric food readily available and less energy exerted for travel, sustenance, and protection. But our underlying genetic makeup has remained largely unchanged, with a continued biological need to engage in physical activity to use our stored energy (Chakravarthy & Booth, 2004). Optimal health and fitness, therefore, still require the continuous maintenance of the equilibrium between diet and exercise. When these elements are balanced (e.g., caloric expenditure is equal to caloric intake),

there are a number of positive benefits and a decrease in the risk of negative health consequences.

In the United States, the cultural and environmental requirements of daily life no longer demand physical activity to the degree that they have in the past, making it more difficult to meet our biological needs and maintain a healthy equilibrium (Sturgeon & Meer, 2006). Along with our culture's evolution, the topography of physical activity has changed from being a predominantly mandatory behavior to an adjunct behavior characterized by diverse activity choices. Physical activity, for many individuals, is now achieved through careful planning in order to incorporate it into their busy schedules. For these individuals, cognitive strategies are now needed to navigate their schedules and activity choices; maintaining an active lifestyle has become a more difficult and multifaceted endeavor than ever.

Public Health and Physical Activity

In the early 1950s it became apparent that the affluent American lifestyle did not promote an adequate level of physical activity (Sturgeon & Meer, 2006). When compared to other industrialized countries, the physical fitness of our youth was deficient. In order to address growing concerns of the public's physical activity habits, in 1956 President Eisenhower established the President's Council on Youth Fitness (now named the President's Council on Physical Fitness, Sports, and Nutrition). The goal of the council was to sound the alarm, educating, motivating, and encouraging individuals and communities to promote and adopt active lifestyles. Now a part of the U.S. Department of Health and Human Services (U.S. DHHS), the council continues to target America's fitness with calls for research and support for federal, state, and local services, programs, and agencies.

In 1996, the publication of the Surgeon General's report on physical activity and health continued to advance the public's view of physical activity as an essential factor of general health and quality of life (U.S. DHHS, 1996). Leading experts in physical activity and health fields developed the report and summarized the existing literature concerning the role of physical activity in preventing disease and the quality of interventions available to increase the public's physical activity. Despite the government's concerted efforts, the fitness of our nation has continued to plummet, and inactivity has become a central variable in our current health crisis. A better understanding of physical activity and individuals' attitudes towards being active may help reverse this downward trend.

Defining Physical Activity

To provide clear operationalization of physical activity for health-related research, Caspersen, Powell, and Christenson (1985, p.126) provided definitions to differentiate between the terms physical activity, physical fitness, and exercise. Physical activity is defined as "any bodily movement produced by skeletal muscles that result in energy expenditure." Exercise, a subset of physical activity, is "planned, structured, and repetitive and has as a final or an intermediate objective the improvement or maintenance of physical fitness." Physical fitness is a "set of attributes that are either health- or skill-related." Although in research these distinctions are necessary, in everyday, public vernacular these terms are commonly used interchangeably and collectively refer to a range of activities that expend energy.

The purpose of the current study is to acknowledge the expansive nature of activities that contribute to mental and physical health for the general community, thus a broad definition of physical activity is warranted. Physical activity and exercise, therefore, are used synonymously,

both denoting energy expenditure. Examples of physical activity include recreational activities, hobbies, competitive and leisure sports, aerobic and non-aerobic exercise, among others. This collective definition is in agreement with the U.S. DHHS (1996), which describes exercise as planned physical activity. To complete the definition of exercise, the inverse, a sedentary lifestyle or inactivity, is characterized by *no participation in deliberate physical activity beyond daily functioning*.

The Physical Activity and Health: Report of the Surgeon General highlights the diverse range of American exercise behaviors (U.S. DHHS, 1996). From a national survey, participants were asked to select activities in which they had participated recently. Walking was endorsed as the most common of the listed activities, followed by gardening and yard work, and then bicycling, strengthening and stretching exercises, running, participating in aerobics, dancing, and swimming. The survey illustrated that the type of physical activity and rate is quite variable between and within different populations. For example, there were different trends for men versus women: Men reported more yard work, strength training, and running as well as contact sports, while women reported more walking, aerobics, and dancing. Men and women equally reported stretching, bicycling, stair climbing, and swimming. Despite these differences, both genders endorsed a variety of ways to incorporate physical activity into their lifestyles.

Variables Related to Physical Activity

Health behavior research has identified a number of variables related to physical activity in both the sociodemographic and social-cognitive domains (Armitage & Conner, 2000). Activity level varies according to different sociodemographic variables, such as geographical location, education, ethnicity, age, gender, and economic status. For example, education and

income level demonstrate an inverse relationship with activity rates (U.S. DHHS, 1996). Rates also vary by geographical location. Residents of the Southern states report the least activity whereas those in the North Central states report the most. Ethnicity also appears to play a role in shaping physical activity rates: Hispanic populations report the lowest levels of exercise, whereas White non-Hispanic populations report the highest.

Ultimately, it is up to individuals to make the decision to live an active, healthy lifestyle; however, it is prudent to realize that there are a number of factors involved in this decision. Barriers to physical activity are recognized by social cognitive theories as a key factor that impedes individuals from starting and maintaining adequate exercise (U.S. DHHS, 1996). Age, geographic location, weather, socioeconomic status, disabilities, social and environmental restrictions, psychological factors, and time are the most common types of barriers reported (Seefeldt, Malina, & Clark, 2002; Napolitano, 2000). These barriers can be external or internal to individuals and, therefore, can operate and interact in various ways.

One consistent finding across both aggregate and individual patterns is that individuals' physical activity rates tend to decline across their lifespan. These studies show that physical activity has a relative peak in adolescence and then a consistent decline into adulthood (Caspersen, Pereira, & Curran, 2000; ; Kahn et al., 2008; Kimm et al., 2002; Nader, Bradley, Houts, McRitchie, & O'Brien, 2008). In particular, the sharpest decline is during the ages of 15-18, with rates decreasing around 3-8% per year. Activity then continues to decline into early adulthood, from the ages of 18-29, while in middle adulthood the patterns stabilize before declining again in later adulthood. It is concerning that these downward trends are found to start in young adult years, as these individuals are developing habits that will most likely persist into

adulthood. These trends, therefore, demonstrate the need to understand what factors motivate individuals to become engaged and stay engaged in physical activities (Perkins, 2004).

It is easy to assume that young-adults have more time and energy to be active and are, therefore, more fit and healthy. It is also thought that college students are more active than non-students are, but the data suggest otherwise. A survey of 738 college students (18-27 years old) found activity rates similar to the general population with the average rate of exercising well below the recommended level at only 2-3 times a week and 21.6% of the student sample being classified as overweight (according to a body mass index-BMI above the 85^{th} percentile) (Huang, Harris, Lee, Nazir, Born, & Kaur, 2003). It appears that the transition from high school to college results in a notable decrease in physical activity levels. For example, Bray and Born (2005) found a 22% drop from adequate exercise rates to below the recommended level in a sample of college students during their first year of college (Bray & Born, 2005). The young adult years are important to target clinically because individuals are developing lifestyle habits that will persist throughout the rest of their lives. Unless effective interventions target these unhealthy habits, obesity and lack of physical activity will be major factors attenuating future life expectancy (Olshansky et al., 2005).

Longitudinal research demonstrates that both external (e.g., environmental and social) and internal (e.g., personality, genetic) factors influence individuals' activity over their lifespans (Hagger, Chatxisarantis, & Biddle, 2001). These differences suggest that some individuals may be predisposed to seek out activity, whereas others may need incentive from external aspects to participate. Individuals' personal qualities can influence their activity choices and experiences. Qualities such as energy, health, and athleticism are found to be quite stable over time; even children's expression of these qualities are related to their activity participation as adults

(Caspersen, Pereira, & Curran, 2000; Seefeldt, Malina, & Clark, 2002; Thompson, Humbert, & Mirwald, 2003).

Other studies that have examined the role of external factors of physical activity have indicated that the types of activities individuals are exposed to set the stage for later activities. For example, several studies have found that children who participate during after-school hours in sports, both individual and team, have greater physical activity rates as adolescents and as adults (Tammelin, Näyhä, Hills, & Järvelin, 2003; Kraut, Melamed, Gofer, & Froom, 2003; Perkins, 2004). Individuals who participate in a wide variety of athletics, especially in relatively intensive endurance sports (e.g., skiing, running, etc.) are found to have the highest levels of activity (Tammelin, Näyhä, Hills, & Järvelin, 2003).

Exposure to a variety of sports and activities is important for a number of reasons (Thompson, Humbert, & Mirwald, 2003; Kirk, 2005). First, broad exposure allows individuals to acquire fundamental athletic skills and facilitates the creation of activity options by helping individuals become proficient at new and different physical activities. It also promotes the development of social relationships through athletics and increases the likelihood that individuals will identify activities that meet their unique needs, interests, and abilities.

In addition, from a behavioral perspective, a review of the literature demonstrates that past behaviors have residual effects that increase the chances of similar future behaviors (Ajzen, 2002). These effects appear to go beyond the formation of habits, especially when the environment is unpredictable, as is often the case with multifaceted lifestyle choices such as physical activity. Current behavior, therefore, may function in a semiautomatic manner, influenced by both automatic behavioral patterns and conscious cognitive planning (e.g., outcome expectancies).

Intrinsic and environmental factors influence activity participation, but neither one of these factors operates in exclusion; rather, they interact to create a distinct experience that can alter individuals' motivation, attitudes, and future activity participation. For example, a study by Taylor et al. (1999) examined specific qualities of athletic experiences in childhood and adolescence and then related these variables to the participants' adult activity participation. An interesting result was that adolescents who recalled that they felt forced to participate in activities were less likely to participate in activities in adulthood. Therefore, even if individuals have regular exposure to a variety of physical activities, it is important that they feel personal control and investment in this participation.

It can be particularly difficult for children and adolescents to establish autonomous activity habits because most of their physical activity is not self-governed and is largely dependent on environmental factors. Family schedules/lifestyles, parent-directed sports participation, school physical education requirements, etc., all determine the extent of how active a child can be (Kahn et al., 2008). Therefore, a critical time to target individuals' attitudes about being active are in the young adult years when personal and independent lifestyle habits are being established.

Physical Activity Recommendations

In light of a comprehensive review of the research that examines the physiological mechanisms by which physical activity provides health benefits, the American College of Sports Medicine (2008) and the American Heart Association, in conjunction with the U.S. DHHS (HHS), developed physical activity and public health guidelines for the American public. These guidelines recommend a total of 30 minutes of physical activity 5 days a week, or a total of at least 150 minutes of exercise per week to achieve most health benefits. In order to meet the unique needs of different groups according to age, physical limitations, or risk factors, these recommendations may be adjusted.

In light of the government's recommendations, four categories of physical activity levels are further delineated by the U.S. Department of Health and Human Services (2008): (a) inactive, (b) low activity, (c) moderate, and (d) high activity. Inactivity is defined as no activity beyond daily living requirements and is considered a health risk. Low activity is characterized by any activity above normal living demands not exceeding 150 minutes a week (moderate intensity) or 75 minutes a week (vigorous intensity). Even a low level of activity is considered more favorable than an inactive level and is associated with some health benefits such as improved cardiovascular, musculoskeletal, metabolic, endocrine, and immune systems. Moderate activity is the recommended level for most health benefits and is characterized by150-300 minutes of moderate activity or 75-150 minutes of vigorous activity per week. Finally, high activity is more than the equivalent of 300 minutes of moderate intensity activity in a week and is associated with increased health gains.

National activity trends, according to the Behavioral Risk Factor Surveillance System (BRFSS), show that only an aggregate 48.8% of individuals meet the guidelines of physical

activity, 37.7% report insufficient activity rates, whereas 13.5% reported *no* activity in the previous month (Centers for Disease Control and Prevention, 2010). In other words, over one-half of adults in America fail to meet the recommendations levels for physical activity. According to 2008 survey results, 25.1% of individuals report no leisure time physical activity. The trend for young adults (18 to 29 years old) shows that 18.9% of males report sedentary lifestyles and 25.4% of females report no physical activity (U.S. DHHS, 1996). For both males and females, the prevalence of inactivity steadily increases with age. These data suggest that 36% of females and 32% of males 65-74 years of age reporting sedentary lifestyles. The findings of these reports indicate that the majority of adults do not meet the recommended levels of physical activity and suggest that many Americans can benefit from increasing their activity levels.

Some individuals are able to achieve adequate levels of physical activity through their occupational demands, but the majority of individuals must rely on other strategies to meet their physical activity needs. The latter population must consciously choose to make physical activity a part of their lifestyle by incorporating sufficient physical activity into leisure time (i.e., hobbies, recreational activities), participating in organized sports, or adopting lifestyle activities (i.e., by walking to work). The focus of this research is on those individuals who must choose to make exercise a part of their lifestyle.

Benefits of Regular Physical Activity

Exercising does not have to be an extreme undertaking, nor part of a major life overhaul, in order to provide some health benefits. Hill et al. (2003) hypothesized that an increase of energy expenditure of only 100 calories a day (e.g., the equivalent of walking briskly or raking

leaves for 15-20 minutes) may prevent weight gain in many people. The purpose of Hill's claim was to encourage individuals to find small ways to increase activity throughout their day. Even a small increase in simple activities, such as walking, can produce positive health benefits, and for nearly all individuals such minor lifestyle adjustments are realistically achievable.

In general, physical activity is theorized to have a dose response relation to health (Lee, 2007). Health benefits are thought to increase in proportion to amount of activity; therefore, each increase in activity is presumed to add health benefits (U.S. DHHS, 1996). For example, a sedentary lifestyle characterized by minimal activity greatly increases the risk of acquiring negative health outcomes, such as heart disease or diabetes. The dose response model of physical activity suggests, however, that even a minimal dose of physical activity will decrease some of the risks and improve overall health. Increasing to a moderate level of exercise will foster health benefits and decrease risks even more, whereas, regular physical activity will decrease the risks significantly as well as provide noticeable health benefits.

Most of the studies that document the health benefits of physical activity have examined the positive effects of endurance or aerobic exercise (U.S. DHHS, 1996). Relevant findings are summarized in the Surgeon General's report that highlights the remarkable effects of physical activity. For example, physical activity, mediated by improved cardiovascular health, is associated with a lower mortality rate for both young and old. This relationship is even stronger when cardiovascular health is used to predict health outcomes, and it is argued that cardiovascular health may be a better indicator of physical activity than self-reported recall. Physical activity is also found to have an inverse relationship with cardiovascular disease, coronary heart disease, stroke, diabetes, and high blood pressure. It also helps control weight, build and maintain healthy bones, muscles, and joints, and it helps aging individuals maintain

strength, flexibility, and balance. At a biological level, physical activity functions to improve hormone secretion, immune functioning, and metabolism.

Animal studies have established the positive effects of exercise on the central nervous system as well (Ding, Vaynman, Souda, Whitelegge, & Gomez-Pinilla, 2006). These studies suggest that exercise, and the associated increase in blood flow to the brain, results in improved protein uptake, energy metabolism, and neuronal plasticity. Specifically, they have found that protein uptake is increased in hippocampus cells, an area of the brain associated with memory.

Similar results of exercise's effects on brain health and functioning have been established with humans as well. For exmple, Davis et al. (2011) examined the relationship between exercise and executive functioning and achievement. Participants (N =171 children) were assigned to a daily exercise program and completed a standardized neuropsychological battery at baseline and posttest. Results showed a dose-response relationship between the benefits of exercise on executive function and mathematic achievement, which were thought to be the result of increased activity in the prefrontal cortex and bilateral parietal cortex. Overall, these results suggest that exercise improves both cognitive functioning and achievement, along with brain health and development.

Physical Activity as an Intervention

Physical activity benefits mental health both directly (i.e., psychological variables) and indirectly (i.e., biological or physical variables) (U.S. DHHS, 1996). The empirical evidence supports physical activity's effectiveness as a psychological intervention, both as an adjunct to treatment and as an independent intervention. The United States Department of Health and

Human Services (1996) and the National Institute for Clinical Excellence (2004) are among the organizations that endorse physical activity as an effective intervention. However, there has been limited dissemination of exercise interventions in applied settings (e.g., limited recognition in textbooks, treatment manuals, and clinical practice) (Callaghan, 2004).

An article by Donaghy (2007) summarized evidence of the effectiveness of exercise as a direct intervention and protective aid for depression and other mental health conditions. The article presented evidence from three meta-analyses and sixteen randomized controlled trials (RCTs) on the efficacy of exercise for treating depression. Across studies, exercise demonstrated effectiveness independent of age, mental health history, and country of origin. The combined effect size of 11 treatment outcome studies found large effect sizes when comparing exercise as a stand alone treatment for depression against control groups (d = 1.42) (Stathopoulou, Powers, Berry, Smits, & Otto, 2006). The results of these studies strongly support the utility of physical activity as a clinical intervention.

Exercise has also been shown to be effective in treating anxiety disorders. For example, a study by Broocks et al. (1999) compared physical activity to an effective drug treatment and placebo group for the treatment of panic disorder. Forty-six patients with moderate to severe panic disorder (with or without agoraphobia) were assigned to a physical activity group, clomipramine (112.5 mg/day), or a group that received placebo pills. Results showed that both the medication and physical activity groups had a significant decrease in anxiety (and depressive) symptoms compared to the placebo group.

A meta-analysis of the clinical application of exercise treatment for anxiety described over 30 published reviews that collectively found overwhelming support for the clinical utility of exercise (Scully, Kremer, Meade, Graham, Dudgeon, 1998). In addition, combined exercise-

anxiety treatments demonstrate impressive effect sizes of 0.56 for reducing state anxiety and .34 for reducing trait anxiety (Callaghan, 2004). With the amount of supporting data, clinicians are encouraged to use physical activity as a direct intervention or as part of ongoing lifestyle management strategy (Berk, 2007; Paluska & Schwenk, 2000).

In addition to preventing and alleviating psychological symptoms, exercise also improves the general well-being of clinical and normal populations (Fox, 1999). The clinical benefits of physical activity are often distal (e.g., the prevention of heart disease); consequentially, recognizing the immediate positive physical and mental effects are important in order to increase the immediate reinforcement of exercise. For example, exercise produces enjoyment inherent in the activity itself; it reduces stress, improves self-esteem as well as sleep, increases energy, and even improves cognitive functioning. Further, the benefits are independent of individuals' current health status and are experienced by everyone who participates. These positive outcomes of activity can directly influence people's attitudes toward exercise, ideally improving their enjoyment and motivation to engage in future activity.

The goal of exploring the physical activity-health relationship is to demonstrate that all individuals can achieve a realistic and balanced level of exercise for their lifestyle while still meeting the activity amount needed for their health requirements. Even individuals with disabilities or other restrictions can find some level or type of activity that would benefit their personal health. At the heart of the government's efforts to promote physical fitness is the belief that balanced, active lifestyles are central to a happy and healthy society. Although physical activity is a cost effective and safe treatment, there are some associated risks inherent in activity behavior, so it is important at any level to monitor injuries and other complications that might result as an outcome of physical activity behavior (U.S. DHHS, 2008).

Risks Associated with Physical Activity

Although the benefits of exercise are diverse and well documented, a comprehensive representation of activity must also acknowledge the increased risks associated with physical activity. The type of activity, intensity, and frequency, along with other individual and environmental factors, all contribute to the likelihood of injury. Common injuries include musculoskeletal injuries (e.g., strains, tears, fractures, and tendinitis), metabolic abnormalities (e.g., hyperthermia, electrolyte imbalance, dehydration, and amenorrhea), hematologic and body organ abnormalities (e.g., anemia and hematuria), activity specific hazards (e.g., travel on roadways, falls, contusions, lacerations, and concussions), respiratory complications (e.g., asthma), and possible cardiac complications with pre-existing arrhythmias (U.S. DHHS, 1996).

Wilson et al. (2011) examined the long-term effects of intensive physical exertion in a unique group of life-long elite endurance athletes (a group of men who had completed at least 100 marathons) and compared them to an age matched control cohort and a group of younger athletes. The findings were unexpected. A high prevalence (in 50% of the target group) of myocardial fibrosis (i.e., thickening and loss of flexibility in the heart) was observed in the healthy, non-symptomatic life-long veteran male athletes. No cases were found in the age-matched controls or younger athletes. These findings suggest a relation between life-long, intensive endurance exercise and myocardial fibrosis. Although these results are noteworthy, the vast majority of individuals are not participating in this level of life-long extreme physical strain nor is this level of physical activity intensity required to achieve notable health benefits; therefore, they would not incur these same risks. These findings, however, do recognize the serious concern of overtraining. The findings also highlight the need to examine in more detail if

there is a threshold, and if so, where the point of diminishing returns is for physical activity and positive health benefits.

Given the risk of complications and injuries with physical activity, it is always recommended that individuals consult with a physician before starting an exercise program (USDHHS, 1996). It is also recommended that physical activity be included as part of a balanced and healthy lifestyle. According to health professionals, despite the risks and adverse consequences, the benefits of exercise and physical activity far outweigh the costs at both the individual and societal levels.

Consequences of Insufficient Physical Activity

Despite the extensive support of the short and long-term health benefits of consistent moderate levels of exercise, the majority of the population still fail to achieve sufficient levels of physical activity. Regrettably, in cultures that promote continuous economic and technological development, such as in the United States, a sedentary lifestyle has become the norm (Peters, Wyatt, Donahoo, & Hill, 2002). This modern environment has shaped lifestyles where exercise is an inconvenience, not a requirement. Environments rich in food and stationary entertainment in conjunction with low activity habits have resulted in our present health crisis marked by preventable diseases and obesity.

In developed countries such as the United States, there has been a large shift to non-communicable diseases as the main cause of death and mortality (World Health Organization, 2004). For example, preventable conditions caused a total 60% of the 56 million deaths in 2002. The predicted rate of non-communicable diseases will continue to increase while influencing

individuals at younger ages. In general, however, the main projected causes of disability include heart disease, depression, respiratory infections, tuberculosis, and HIV (Murray & Lopez 1997).

Consider the consequence of sedentary lifestyles. The Center for Disease Control and Prevention (2008) provides examples of health costs that could be greatly reduced by physical activity: Obesity approximately $117 billion and diabetes an estimated $174 billion a year. These are just two examples of the monetary costs to society. Nonetheless, with close to half of the population in America living with chronic illness, these conditions influence more than just pocketbooks.

Physical activity plays a vital role in decreasing the risk of a broad range of negative health outcomes. According to the National Cancer Institute (2008), regular exercise reduces the risk of colon cancer by up to 50% and reduces the risk for breast, prostrate, and endometrial cancer. Physical activity has also been clearly linked to the prevention of type 2 diabetes, osteoporosis, cardiovascular disease, mental health disorders, chronic diseases, obesity, dementia, and even premature death (Andel, Crowe, Pedersen, Fratiglioni, Johansson, & Gatz, 2008; Donaghy, 2007; Leveiat, 2008).

Physical activity directly influences physical and mental health in two important ways: by decreasing the risk of negative health consequences and by increasing general well-being. Hundreds of peer-reviewed studies have established the negative impact of inactivity and the health benefits of being physically active (Blair, LaMonte, & Nichaman, 2004; Jones & O'Beney, 2004). Given the ethical responsibilities of health professionals, the conditions clinicians should be most concerned with are those associated with significant personal or societal cost (American Medical Association, 2006). One method of reducing health costs is

through preventative action. Indeed, the preventative utility of exercise this is one of the most supported areas of physical activity research in both the biomedical and psychological domains.

As a response to the concerning trends of obesity and inactivity, in 2008 the U.S. Government requested applications to fund research in order to identify important mechanisms in physical activity behavior (National Cancer Institute, 2008). Despite the progress that has been made, the funding and call for research continues as the U.S. Department of Health Services reports that the majority of adults still do not engage in sufficient physical activity despite the efforts to publicize the health benefits of an active lifestyle (Centers for Disease Control and Prevention, 2007).

Since the second half of the 20th century, empirical support has accumulated and research continues to establish new ways in which physical activity is important for physical health leading to established recommendations for physical activity participation (Blair et al., 2004). As model of health and fitness have also continued to advance, appreciation of the link between physical health, fitness, and mental health domains has only become more supported. The reciprocal nature of these different health domains sets the stage for the utility of physical activity in treating and preventing mental health disorders.

Models of Health

The biomedical model has been the traditional approach in healthcare, since the mid-nineteenth century, and has driven the diagnosis, treatment, and research of illness in the Western world (Annandale, 1998). Within this model, a health practitioner employs a problem solving process to identify and treat the symptom, disease, or illness of the patient. Illness is viewed as a physical and biological phenomenon with a focus on the organic, somatic

complaints. Accordingly, health is perceived as the absence of disease and illness. With strict adherence to this model, psychosocial and behavioral issues are outside of the scope of medicine's responsibility (Engel, 1977). The biomedical perspective towards health does not emphasize the complex interaction between the various health domains. It also leaves very little responsibility within the individual to take initiative to improve their health, because illness and physical symptoms are biologically determined.

To build upon this biomedical model and advance our conceptualization of health, the biopsychosocial model of health was proposed by George Engel (1977). Engel's model conceptualizes all disease (whether diabetes or depression) along four dimensions: the physical, psychological, social, and behavioral. He emphasized the importance of each of these domains and noted how each of these areas reciprocally influences the others (Smith & Strain, 2002).

Case conceptualization from the biopsychosocial framework encourages collaborative communication between the clinician and patient (Smith & Strain, 2002). In order for the clinician to have a thorough understanding of the client's diverse domains, there must be intentional give and take of information. According to this philosophy, individuals' four health dimensions closely interlace. Therefore, an intervention in the biological domain will automatically influence behavioral, psychological, and social functioning. Thus, the clinical use of physical activity is particularly effective because it directly affects individuals' biological and psychological functioning while indirectly influencing their social well-being. In addition, physical activity provides health benefits with negligible expense, minimal negative side effects, broad availability, and low personal and economic cost. Even further, it empowers patients and encourages them to take initiative with their health and quality of living.

Despite the government's efforts to publicize the benefits of being activity, the prevalence of inactivity continues to grow (U. S. Department of Health and Human Services, 1996). Having the access to knowledge, therefore, that physical activity prevents health problems and improves a broad range of general functioning, does not directly translate into action. People still face limited resources and barriers that make it difficult to place physical activity as a priority. A particular area of need, then, in the research is creating ways to translate empirical knowledge into real world change for people. One way to meet this need is to develop and refine theories that identify mechanisms of action and directly influence individuals' decisions to be active. In particular, the development and application of health behavior interventions focus on challenging the cognitive attitudes toward physical activity. Clinicians use various social-cognitive models to conceptualize health behavior and to guide treatment planning.

Models of Health Attitudes and Behavior

Intervention research for physical activity has drawn upon social cognitive models to initiate behavioral change (Marcus et al., 2006; U.S. DHHS, 1996). These theories include the health belief model (Rosenstock, 1966; Rosenstock, Strecher, & Becker, 1988), transtheoretical model (Prochaska & DiClemente, 1984), protection motivation theory (Maddux, & Rogers, 1983; Roger, 1983), theories of reasoned action (Ajzen & Fishbein, 1980) and planned behavior (Ajzen, 1991), the self-efficacy and social cognitive theories (Bandura, 1986, 1989). Each one of these theories conceptualizes health behavior in different ways, each with its own strengths and weaknesses. The similarities between the theories are clinically meaningful, as the overlapping constructs, arguably, have the most support across theories.

Social Cognitive Theory

Bandura's (1977a) social cognitive theory (SCT) (originally termed the social learning theory) describes behavior as the outcome of an interaction between individuals, behaviors, and the environment. This theory was one of the first to integrate the behavioral and cognitive perspectives into a unified theory. Applying SCT to physical activity behavior involves three main interactions: (a) an interaction between individuals and behavior, (b) an interaction between individuals and the environment, and (c) an interaction between the environment and behavior. Cognitive processes (e.g., beliefs) in the SCT are an integral factor of individuals' behavior. These processes are involved in the acquisition or learning of new behavior because of one or more of the interactions outlined above.

Two of the important cognitive constructs derived from these interactions are expectancies and incentives. Expectancies are the predicted outcome of exercise behavior and include expectations about environmental cues, the consequences of exercising (i.e., outcome expectancy), and expectations about one's competence to exercise (i.e., self-efficacy). The value individuals place on an outcome refers to their incentives. Incentives are thought to be the reinforcing value of (physical activity) behavior.

According to the social cognitive theory, the process of acquiring new attitudes and behaviors does not occur in isolation. Both the physical and social environment are posited to contribute to learning, especially through our observation and imitation of those in our environment. The social cognitive theory is a foundational theory in the exercise and health literature. Of particular significance in the health behavior research are the two main constructs from SCT: self-efficacy and outcome expectancy.

Self-efficacy Theory

Self-efficacy theory stems directly from the social cognitive theory. As the name indicates, the focus shifts to the personal belief of competency or self-efficacy (Bandura, 1977b, 1982, 1997). Self-efficacy is a judgment of one's capability to organize and execute a behavior, or achieve a desired outcome.

Self-efficacy theory posits that beliefs or perceptions about competency are potentially more influential than the reality itself. For example, individuals' belief about the probability that they can be physically active will influence if they even attempt the behavior. If individuals do not believe they are able to perform an action, they may never participate and, consequentially, never developing any expectations about the activity. Bandura labels these beliefs or judgments *efficacy expectations*. In the literature, self-efficacy has emerged as the most consistent correlate of physical activity (Trost et al., 2002).

The Health Belief Model (HBM)

The health belief model (HBM) was originally developed in the 1950s by the Public Health Service to increase the use of preventative resources, such as public screenings and vaccinations (Rosenstock, 1966). The current HBM describes four basic determinants of behavior or health motivation (Janz & Becker, 1984). The first two are the perceived severity and susceptibility to threat, whereas the final two are the perceived benefits and barriers action. These determinants interact with personal factors to determine motivation towards health behavior.

The HBM also recognizes environmental variables, or cues to action, that account for the influence from individuals' surroundings concerning health behaviors. In response to the social cognitive theory, self-efficacy was also incorporated in the HBM (Rosenstock, Strecher, & Becker, 1988). Positive correlations have been found between HBM and health behaviors; however, they are not as strong as those established by other theories are.

The Protection Motivation Theory (PMT)

The protection motivation theory (PMT) was developed out of the health belief model and it describes behavior as being mediated by cognition. Hence, thoughts can directly change the resulting behavior. As the title suggests, behavior is conceptualized as a protective response. Motivation towards physical activity is, therefore, the function of a threat and the ability to cope (Maddux, & Rogers, 1983; Roger, 1983; Williams, Anderson, & Winett, 2005). According to PMT, four cognitive factors mediate behavior: perceived severity and probability of the threat, perceived effectiveness of behavior, and perceived self-efficacy.

The cognitive evaluation of the severity of the threat influences the incentive or importance individuals assign to the health behaviors. Behavior then depends on whether individuals feel the threat is relevant to them. If individuals perceive vulnerability, they will be more likely to take action. The chosen behavior depends on the perceived effectiveness of the given response (i.e., the expected outcome). Finally, whether individuals actually carry out the behavior depends on their self-efficacy (or belief the behavior can be successfully completed).

Transtheoretical Model

The transtheoretical model was developed in an effort to integrate and focus on the essential variables operating in any effective therapy system (Prochaska & DiClemente, 1984). This resulted in a theory that describes how individuals progress through different stages of change during therapy. Each stage of change describes the quality of thought directed toward a behavior.

The transtheoretical model includes four stages that characterize individuals' cognitions: the pre-contemplative stage (i.e., no intention to change), the contemplative stage (i.e., consideration of change with no action or preparation), the action stage (i.e., active engagement in change of behavior), and the maintenance stage (i.e., maintaining a behavior change). Attitudes, expectations, and behaviors therefore determine individuals' stage of change.

In relation to physical activity, individuals who are sedentary and satisfied with their lifestyle would be in the pre-contemplative stage and might move into a contemplative stage if a physician were to point out the consequences of their lack of physical activity. If individuals choose to act upon this information, they would move into an action stage and begin to participate in physical activity. After individuals have successfully incorporated physical activity into their daily lives, they would move into the maintenance stage and work to continue their activity habits.

The Theory of Reasoned Action (TRA) and Planned Behavior (TPB)

The theory of reasoned action (TRA) describes behavioral intention as the most proximal and influential determinant of (health) behavior (Ajzen & Fishbein, 1980). Behavioral intention can be thought of as the degree to which individuals have planned and are committed to

performing a behavior. Individuals' intentions are determined by their attitudes and perceived social norms.

Originally, the theory of reasoned action conceptualized behavior as voluntary and merely the result of strong intention. However, this simple effect was not supported by research. Therefore, perceived behavioral control, or the belief that one is able to perform a given behavior, was incorporated into the TRA. This addition resulted in a modified theory, the theory of planned behavior (Ajzen, 1991).

According to the theory of planned behavior, when intention is held constant, individuals' perceived control changes the probability of the behavior (Ajzen, 1991). If individuals think a behavior is easy, the perceived control over that behavior is higher. Research has supported the utility of the theory of planned behavior in the health domain, with close to 35% of the variance in health behavior explained by TPB variables.

Each one of these seven theories draws attention to a different factor of physical activity behavior. On the other hand, the overlap and similarity that is found throughout the models advocate for identifying constructs that are robust across the theories and then placing focus on them in treatment (Armitage & Conner, 2000). Several constructs or ideas are strikingly similar across these health behavior theories (e.g., outcome expectancies). This study will focus on the outcome expectancies construct that is defined as the anticipated consequence of one's activity behavior (Williams et al., 2005).

Outcome Expectancies and Experience

The idea of outcome expectancies has been recognized for over six decades and has been applied in a variety of research settings. For example, outcome expectancies explain

reinforcement in the behavioral stimulus-response theory (Stephens, 1942). An organism's outcome expectancies, and future behaviors, are the result of past behaviors that have been reinforced. Over the years, outcome expectancy research has advanced and has been applied with alcohol and substance use, risk-taking behaviors, gambling, treatment outcomes, work motivation, pain management, experimenter bias, and physical activity literatures (Andriessen & Vrije, 1975; Dolce, Crocker, & Doleys, 1986; Jones, Corbin, & Fromme, 2001; Kwekkeboom, 2001; Meyer, Pilkonis, Krupnick, Egan, Simmens, & Sotsky, 2002; Silverman, 1968; Williams et al., 2005). The construct has also played an important role in the development of cognitive-behavioral explanations of behaviors (e.g., physical activity). For example, if an individual participates in physical activity the desirable outcome of being active (e.g., improved mental and physical health) then reinforces the physically active behavior. Given the consequence of the past participation, the individual will anticipate that if the behavior is repeated in the future the consequence will be similar. Because of the established outcome expectancy of positive consequences with physical activity, it is more likely that the individual will participate again in the future, thus repeating the behavior.

Research indicates that outcome expectancies begin to form before individuals even participate in the behavior (Aas, Leigh, Anderssen, & Jakobsen, 1998; Cumsille, Sayer, & Graham, 2000; Katz, Fromme, & D'Amico, 2000). By means of social learning myriad possible consequences are modeled and advertised for individuals, therefore initiating the development of expectancies for the activity (Leigh, 1989; Tickle et al., 2006). Expectancies first develop as broad and gross anticipations, and then, with personal experiences, some strengthen while others level off (Christiansen, Goldman, & Brown, 1985; Leigh, & Stacy, 2004; Murphy-Berman &

Sharma, 2001). Individuals' experiences, therefore, determine if an expectation is strengthened or not.

After the personal experience, the behavior and the expectation start to work in a reciprocal pattern: Positive expectancies prompt more behavior, and more behavior consequences result in greater positive expectancies (the inverse is true of negative expectancies) (Jones, Corbin, & Fromme, 2001; Sher, Wood, Wood, & Raskin, 1996; Smith, Goldman, Greenbaum, & Chrisitansen, 1995). For example, a two year longitudinal study by Aas, Leigh, Anderssen, and Jakobsen (1998) examined drinking in adolescents. For adolescents who had already begun drinking at the beginning of the study, outcome expectancies predicted subsequent drinking. For adolescents who began drinking during the study, expectancies predicted invitation to drink. Then, subsequent early drinking experiences predicted development of positive expectancies. The results, therefore, demonstrate the function of expectancies in both the initiation and maintenance of the reciprocal nature of the relationship between outcome expectancies and behavior over time.

If individuals do not gain personal experiences to support an expectation, the reciprocal pattern is never initiated and the expectation may level off, fade, or be replaced (Katz, Fromme, & D'Amico1, 2000). These findings demonstrate that individuals who have fewer experiences develop their expectancies later and have expectancies that remain weaker over time. If, however, the reciprocal pattern is established, outcome expectancies operate as sensitivities toward the reward or punishment of an activity. Consequentially, established expectancies predispose individuals to experience the next activity in a way that confirms already held expectations, thus, making the relationship between the expectation and behavior even stronger.

Cumsille, Sayer, and Graham (2000) investigated how change in exposure to peer and adult drinking influences expectancy development in adolescents. The results demonstrated that expectancies and rate of exposure to peer and adult drinking predicted rate of change in expectancies. For those with low expectancies, and low exposure, the development of further expectancies decreased over time. However, even if the low expectancy individuals are exposed to a high rate of either peer or adult drinking, their drinking increases to meet these new positive expectations.

Other research, however, posits that experience may be inversely related to expectancies and behavior. In a study by Leigh and Stacy (2004), the prediction of drinking from outcome expectancies was examined at different ages. As part of the National Alcohol Survey, participants were asked about their alcohol intake and alcohol expectancies. The results showed that outcome expectancies explained more of the variance for younger individuals than for the older individuals. A different, weaker relationship between expectancies and drinking behavior was also found for those who did not drink. The authors posited that expectancies change over time, as individuals gain more and more diverse outcomes with drinking behavior. These and other findings suggest that individuals with high levels of experience (e.g., older individuals) may be influenced more by habits than their cognitive processing (i.e., expectancies). For those with less experience and fewer habits (e.g., younger individuals), social and cognitive variables are more salient; therefore, expectancies would exert greater influence on their behavior.

There is some evidence that this pattern may also be found in physical activity outcome expectancies. Norman, Conner, and Bell (2000) examined physical activity and Theory of Planned Behavior variables (i.e., cognitive variables) of 87 patients, initially and at a 6 month follow up. They found that past behavior predicted variance in current physical activity behavior

beyond that explained by cognitive factors, suggesting that habits had a direct effect on future behavior above that explained by cognitive variables.

In general, the outcome expectancy literature suggests that the relationship between expectancies and behavior may vary as a function of experience. In both alcohol and smoking expectancies research, the strength of the relationship between expectancies and behavior is moderated by level of experience; however, this relationship has not been established for physical activity outcome expectancies (Leigh, 1989; Wahl, et al., 2005). A particular area of weakness in the health behavior literature is in the identification and understanding of moderating variables for outcome expectancies and physical activity behavior (Williams et al., 2005). According to this literature, it is not clear whether experience enhances or suppresses the relationship between outcome expectancy and behavior. The current study will examine this possible moderating effect of experience on the outcome expectancy-behavior (i.e., physical activity) relationship.

Considering the pressure of competing choices in our culture's environment (e.g., television, computer, entertainment) in relation to physical activity, individuals most likely will be required to continue to use cognitive strategies to maintain their behavior rather than relying on habits alone. It is, therefore, the author's belief that cognitive strategies will continue to be important for physical activity behavior even for individuals with diverse physical activity histories and experiences. Further, given the reciprocal nature of expectancies and behavior, it is anticipated that activity experience will have an enhancing moderating effect on the relationship between outcome expectancies and physical activity behavior.

Outcome Expectancies and Physical Activity

Each of the social cognitive models is unique in how it explains the process of physical activity behavior. Nevertheless, they all agree that individuals' cognitive evaluation of the outcome of physical activity (i.e., outcome expectancy) is an important factor influencing motivation, satisfaction, and future behavior toward physical activity (Williams, et al., 2005). Because expectancies are a central factor in social cognitive models of health behavior, psychologists often target outcome expectancies in physical activity research and with intervention development.

Past research findings show small but significant correlations between outcome expectancies and physical activity (r = .15-.24) (Williams et al., 2005). For example, a study by Dzewaltowski (1989) compared the social cognitive theory and theory of reasoned action in predicting physical activity. Measures of the social cognitive variables were given to participants and then prospective physical activity behavior of sample was measured over a 7-week time. Self-efficacy and dissatisfaction were found to predict exercise behavior; in addition, dissatisfaction/expectancy variable significantly increased the amount of variance explained. Thus, it was found that participants who had high self-efficacy and were satisfied with their anticipated outcomes (e.g., present body weight) exercised more days per week.

Outcome expectancies have been theorized to function as a mediator between other social cognitive variables and physical activity. A study by Ayotte, Margrett, and Hicks-Patrick (2010) examined social cognitive variables (i.e., outcome expectancies, self-efficacy, barriers, and social support) in married couples who lived in the community. Path analysis of the survey results demonstrated that self-efficacy related directly, and indirectly, to physical activity through outcome expectancies, barriers, and self-regulatory behaviors. The results suggest that

interventions should target multiple social cognitive constructs (including outcome expectancies) in order to target physical activity behavior change.

Some studies have examined the relationship between outcome expectancies and physical activity in unique populations (HIV individuals, rural youth, over-weight sedentary adults); however, these studies have failed to find a significant effect of outcome expectancies on exercise behavior (Williams et al., 2005). Many studies that have examined outcome expectancies, however, have measured the construct as part of a battery of social cognitive constructs (e.g., barriers, self-efficacy, behavioral intention, and stages of change). Less research has focused on examining the quality of measurement and unique predictive validity of the physical activity outcome expectancy construct, especially for diverse populations.

In the existing social cognitive literature related to physical activity, the relationship between outcome expectancy and exercise is the weakest for young adult populations (Williams et al., 2005). Existing measures of outcome expectancies, however, include item content that does not directly relate to young adults (e.g., items that include reference having children) and, therefore, may not be valid for this population. For example, the Physical Activity Outcome Expectancy Measure by Perkins et al. (2008) and the more extensive Expected Outcomes for Physical Activity Scale (Steinhardt & Dishman, 1989) both demonstrate adequate utility in an older-adult population. Weak findings, therefore, are likely the result of sampling limitations (e.g., young adults sampling of college students) and of inadequate conceptualization and measurement of the construct in a young adult population.

To improve the measurement of the outcome expectancies construct and focus on developing a thorough understanding for a young adult population, the Swan Exercise Expectancy Measure (SEEM) was created (Swan, 2009). Initial studies addressing the

development and validation of the Swan Exercise Expectancy Measure (SEEM) for young adult populations demonstrated (a) good fit of the SEEM model structure in the student samples and (b) validity of the SEEM with significant correlations between scores and theoretically related constructs (e.g., self-efficacy). To corroborate this measure for clinical and research applications, however, further validation of the measure was needed. In addition, the results from these initial studies and weaknesses in the literature prompted a closer examination of the physical activity outcome expectancy construct in this population.

The initial validation studies of the SEEM found the physical activity level of college samples to be typical of a general, young adult population (28.0% of the sample reported exercising 0 to 1 day/week, 53.0% reported exercising 2 to 4 days/week, and 17.0 % reported exercising 5 or more times per week; Swan, 2009). According to the health behavior literature, and the results from the SEEM validation study, activity rates in college versus communities should not be significantly different. Thus, it was anticipated that the validity of the SEEM will generalize to this more heterogeneous population and that the SEEM structure will demonstrate adequate fit. Although the SEEM's four factor structure was empirically supported in the initial study, the correlations between the scale factors were quite high, ranging from $r = .44$ to $r = .86$. These findings question the independence of the Positive, Negative, Practical, and Social factors of the SEEM and suggest that exploration of other models may be advantageous.

Sampling Issues with Young Adults

Research that focuses on young adult populations is frequently completed with convenience samples of college students. Further, studies that do recruit participants from the general community usually have restricted scope and recruit participants from the local

metropolitan areas. These sampling issues limit the generalizability of the findings, however, the monetary costs and time of recruiting a larger sample usually dissuade researchers from obtaining a more heterogeneous sample. As a way of addressing this weakness, using the internet to recruit participants has gained popularity and empirical support.

Research that employs internet data collection yields comparable participant characteristics and results to that of in-person samples (Meyerson, & Tryon, 2003). Nevertheless, every method of sampling has inherent limitations and biases. To minimize the biases from using only one method of survey recruitment, Simsek and Veiga (2001) recommened using multiple modalities (i.e., internet and in-person recruitment). This study increased the scope of its community sample beyond the local, small-Midwestern community and included an even more heterogeneous sample of young adults by using various forms of advertisements (e.g., fliers, newspaper, and internet advertisements) to recruit participants.

Purpose of the Current Study

The purpose of the current study was to extend the literature on outcome expectancies for physical activity by examining exercise expectancies, history of exercise experience, and current physical activity in a community sample of young adults. To improve the measurement and focus on developing a thorough understanding of the outcome expectancies construct for a young adult population, the Swan Exercise Expectancy Measure (SEEM) was created and validated in a college sample (Swan, 2009). Weaknesses of the SEEM (i.e., limited generalizability and high correlations between factors) will be addressed.

The first two goals are to extend the validity and generalizability of the SEEM to a community sample of young adults. To advance the conceptualization of outcome expectancies,

other possible models for the SEEM structure were also examined. In addition, according to the outcome expectancy literature, it is not clear whether past experience enhances or suppresses the relationship between outcome expectancy and behavior. A final goal of the current study is to examine the relationship between past physical activity experience on the outcome expectancy-behavior (i.e., physical activity) relationship.

Hypotheses

This study examined three main hypotheses:

1. Hypothesis 1: The SEEM factor structure will be robust (i.e., demonstrate acceptable model fit indices) and will generalize to a community sample of young adults.
2. Hypothesis 2: Convergent validity of the SEEM will be established by a significant positive correlation with current physical activity.
3. Hypothesis 3: Self-reported experience with physical activity will moderate (i.e., enhance) the relationship between outcome expectancy and physical activity.

CHAPTER II

METHODS

Participants

A total of 300 (N = 300) young adults (ages 18-30, M = 23 years old) were recruited from the public. The sample was 74% female (n = 221) and 26% male (n = 79) and was ethnically homogeneous, with only 6% reporting Hispanic/Latino ethnicity and 94% reporting Non-Hispanic ethnicity. Furthermore, 87.3% reported their race as Caucasian (see Table 1 for a more detailed breakdown by race).

Table 1. *Sample Characteristics*

Gender	*n*	*%*
Male	79	26.0
Female	221	74.0
Ethnicity		
Hispanic/Latino	18	6.0
Non-Hispanic/Latino	275	91.7
Racial Background		
Native Hawaiian/Pacific Islander	3	1.0
American Indian/ Alaskan Native	5	1.7
African American	7	2.3
Asian	28	9.3
White	262	87.3

Note. N = 300.

Participants included members of the community between the ages of 18 to 30 who responded to advertisements recruiting subjects for the study. Various forms of advertisements (e.g., fliers, newspaper, and internet advertisements) invited individuals to participate. The

sample included participants from over 30 states representing diverse geographical locations across the U.S. (e.g., from Florida and Texas to Washington and Connecticut).

The initial sample that accessed the survey online consisted of 406 individuals. One hundred and six cases were deleted based on the following exclusion criteria: age not in the range of 18-30 years old (n = 49), did not start/complete the SEEM (n = 44), or an incorrect response on the validity item, "Please choose Disagree as your response to this item" (n = 13). Gender, ethnicity, and health status were not controlled in order to maintain a representative community sample. For completing the study, the participants had the opportunity to win a large prize (e.g., $250 money order) in a raffle.

Procedure

Participation was solicited using several different recruiting modalities including internet advertisements, bulletin boards, public service announcements, newspaper postings, and fliers. For example, the internet advertisements were put on popular websites (e.g., Craigslist and Facebook) and invited individuals to participate in the survey. General community fliers were placed on bulletin boards at grocery markets, department stores, libraries, coffee shops and health clinics.

Advertisements provided participants with a web-link that directed them to the survey. When participants accessed the link, they were presented with a short description outlining the purpose of the study and a consent form. After submission of the consent form, participants were presented, in the following order, with a demographic inventory, a lifetime activity record, and the SEEM. Participants were asked to complete three measures, for a total of 54 items, which took less than 15 minutes to complete. Finally, the participants were presented with a

webpage that thanked them for participating and gave them opportunity to provide their email address to enter them into the raffle for the prize.

All measures were administered with the online survey software, SurveyMonkey.com (©1999-2008) which allowed participants to access and complete the study at their convenience. The design for all but two of the items required participants to respond to the item before they were allowed to advance to the next page of the survey. Exceptions were made for demographic items inquiring about ethnicity and health concerns (i.e., these items did not require a response for participants to advance to the next item).

For individuals who did not have internet access, but may have still been interested in participating in the study, the advertisement also included contact information to request a hard copy of the survey or to schedule an individual appointment and complete the survey in a paper and pencil format. No participants contacted the principle investigator for this option.

Measures

Demographics

The gender, ethnicity, height, weight, current level of physical activity and health status of the sample was assessed using a demographic inventory developed for this study (Appendix B). Current physical activity rate of participants was assessed with the item "On how many of the past 7 days did you exercise or participate in exerting physical activity?" Instructions specified that examples of physical activities include recreational activities and hobbies, competitive and leisure sports, aerobic exercise, and non-aerobic exercise.

Physical Activity Record (PAR)

The PAR (Appendix C) inquired about the range of participants' physical activity experiences. PAR items were adapted from a physical activity inventory used in the Physical Education/Health Education Handbook (Manitoba Education, Citizenship, and Youth, 2008). The PAR includes a comprehensive list of physical activities in four categories: sports, active living, fitness activity, and alternative pursuits. A definition of each of these categories was provided and the participants were asked to place a check mark next to each activity that they have participated in, in the past or currently. At the end of the PAR, the participants were asked to describe their "usual amount of activity" (i.e., Inactivity, Low Activity, Moderate Activity, and High Activity). These four activity choices were operationalized and based on the four categories in the government's activity guidelines (Leveiat, 2008). Finally, participants were also asked to describe their "usual pattern of physical activity" (i.e., Consistent Activity or Inconsistent Activity).

The Swan Exercise Expectancy Measure (SEEM, Appendix D)

The SEEM is a 28-item self-report inventory which measures outcome expectancies for physical activity (Swan, 2009). The SEEM is composed of four factors: negative, positive, social, and practical. The measure includes ten negative outcome items, nine positive outcome items, five social outcome items, and five practical outcome items. The scale, a 5-point Likert-type scale, ranges from 1 (strongly agree) to 5 (strongly disagree). The instructions ask participants to reflect on their level of physical activity and then rate their agreement with each statement.

The total SEEM score is calculated by first reverse scoring the positive items and then summing all items. The composite scores range from 28 to 140, with higher scores being a more desirable outcome expectancy index (i.e., high scores signify positive expectation of exercise or anticipation of more enjoyable outcomes for physical activity). Psychometric properties of the SEEM show excellent internal consistency ($\alpha = .91$, mean inter-item correlation-MIIC $r = .39$, $p < .001$). It is important to note that these descriptive statistics were obtained through the old scoring system. The updated scoring system of the SEEM now requires reverse scoring the negative items. Scoring was adjusted in order to improve the interpretability of the results, with higher scores indicating more desirable, positive expectancies.

CHAPTER III

RESULTS

Sample Descriptives

A correlation matrix of the data is presented in Appendix E. In terms of physical health status, 34% (*n* = 102) of the sample described their health as "excellent," 51% (*n* = 152) as "good," 14% (*n* = 41) as "average," and 2% (*n* = 5) as "poor" (Table 2). Of the sample, 13% (*n* = 40) reported having a health condition that "prevents them from participating in vigorous physical activity."

Body Mass Indices (BMI) were calculated and ranged from 12.48 to 46.17 (*M* = 24.00, *SD* = 4.45), with the average BMI at the high-end of the healthy range (18.5 to 24.9). The descriptive statistics for the physical fitness and activity levels of the sample were within the expected range and similar to those of young adults in a college population (Table 2).

Participants reported the number of days that they had exercised in the past week (*M* = 3.57, *SD* = 2.06), choosing from 0 days (9.7%), 1 day (9%), 2 days (12%), 3 days (18.3%), 4 days (14%), 5 days (19%), 6 days (8.3%), and 7 days (9.7%). These statistics indicate that 63% of the sample (*n* = 189) reported activity levels below the recommended 5 days/week. The current sample's BMI and activity rates were similar to those found in the previous validation study (Swan, 2009). In the previous college student sample the average BMI was *M* = 24.00, *SD* = 5.07 and 74% of the college sample (*n* = 230) reported activity levels below the recommended 5 days/week.

Physical activity record (PAR) data showed that participants' past exercise experiences were characterized by the greatest number of sports activities (*M* = 8.89, *SD* = 5.92), followed by

fitness activities (*M* = 6.71 *SD* = 4.52), active living activities (*M* = 4.98, *SD* = 2.34), and alternative pursuits (*M* = 4.65, *SD* =4.01). On average individuals reported having participated in 25 different physical activities (*M* = 25.23, *SD* = 12.72*)* in their lifetime.

Table 2. *Physical Activity (PA) and Health*

PA (# of Days)	*n*	*%*
0	29	9.7
1	27	9.0
2	36	12.0
3	55	18.3
4	42	14.0
5	57	19.0
6	25	8.3
7	29	9.7
PA Level		
Inactive	28	9.3
Low	86	28.7
Moderate	125	41.7
High	61	20.3
PA Pattern		
Consistent	177	59.0
Inconsistent	123	41.0
Health Status		
Excellent	102	34.0
Good	152	51.0
Average	41	14.0
Poor	5	2.0

Note. $N = 300$. PA = # days in the past week, $M = 3.57$, $SD = 2.06$. PA level = typical amount of physical activity per/ week. PA Pattern = usual pattern of physical activity.

When asked to rate their typical level of physical activity, 9.3% endorsed "inactive" (*n* = 28), 28.7% "low activity" (*n* = 86), 41.7% "moderate activity" (*n* = 125), and 20.3% "high activity" (*n* = 61). When asked to describe their usual pattern of exercise 59% of the sample

described a "consistent pattern" (n = 59) whereas 41% described an "inconsistent pattern" (n = 123).

Validation Analyses

Data Screening Analysis

LISREL 8.80 (Jöreskog & Sörbom, 2006) software was used for the CFA analysis and SPSS 16 was used for all other analyses. Outliers were examined using boxplots and histograms of the data; however, no problematic outliers were identified and all of the data were retained for inclusion in the analyses.

The distribution of the SEEM scores (i.e., mean, standard deviation, skewness and kurtosis of the scores) were examined. The SEEM demonstrated good reliability with the community sample (α = .93, MIIC = .33). The distribution of the composite scores of the SEEM had relatively normal distribution (M =106.33, SD = 15.23, skewness = -.65 and kurtosis = .53).

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis of the Swan Exercise Expectancy Measure examined the original four-factor structure in the community sample of young adults. Each of the 28 items was linked to only one of the four factors. Ten items were linked to the negative outcome factor, eight items to the positive outcome composite, five items to the social outcome factor, and five items in the practical uses of physical activity factor.

Identification of the model required scaling of each latent variable (i.e., each factor) by identifying an indicator (i.e., an item) as the reference parameter, thus giving the factor the same variance as the item (Tabachnick & Fidell, 2007). For example, of the ten items in the negative

outcome factor one item parameter was set to 1.00, as the reference parameter. The item with the highest corrected item correlation (i.e., the item that showed the strongest relation to the factor) was chosen as the indicator item for each of the four factors.

The original SEEM model was tested for fit with the current sample. A good fitting model should produce consistent results across different fit indices (Tabachnick & Fidell, 2007), therefore multiple indicators of model fit were used to estimate model fit. A chi-square test (χ^2), the normed fit index (NFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the goodness-of-fit index (GFI) were used to assess the model fit of the SEEM; results are displayed in Table 3.

Table 3. *Goodness-of-Fit Indices for CFA Model*

Model	χ^2	*df*	*P*	χ^2/df	RMSEA	GFI	NFI	CFI
Four-factor Structure	797.91	344	< .001	2.32	.07	.84	.94	.97

Note. *N* =300. *RMSEA* = root mean square error of approximation; χ^2/df = chi-squared degrees of freedom ratio; *GFI* = goodness-of-fit index; *CFI* = comparative fit index; *NFI* = normed fit index.

Chi-square (χ^2) was used to compare the model fit with an estimated population covariance matrix. A non-significant χ^2 value indicates good model fit; however, this value is often biased and easily influenced by sample sizes. To correct for this bias, a ratio of the χ^2 value / degrees of freedom was used. A value of less than 2 or 3 for this ratio indicates a good model fit (Schreiber, Stage, King, Nora, & Barlow, 2006). Results of the CFA of the current model indicated a good fit with the χ^2/df ratio = 2.32, χ^2 (344) 797.91, $p < .005$.

The Bentler & Bonnett (1980) normed fit index (NFI) compares the χ^2 value of the current model with a model of uncorrelated variables. The NFI value ranges from 0 to 1 with high values (i.e., .95) indicating a good-fitting model. The NFI = .94, of the SEEM indicated a marginal to good fit for the model.

Additionally, the comparative fit index (CFI) compares the model fit in comparison to other models (Bentler, 1988). A CFI value greater than .95 indicates good model fit. The CFI = .97 of the SEEM indicated a good model fit. The root mean square error of approximation (RMSEA) compared the model to a perfect model, thereby estimating the lack of fit in the model (Brown & Cudeck, 1993).

A RMSEA value of .10 suggests a poor model fit, whereas a value of .06 or less suggests a good model fit. The RMSEA = .065 of the SEEM indicated marginal/good model fit.

Finally, the goodness-of-fit index (GFI) estimates the proportion of variance the sample (i.e., SEEM) covariance matrix explains in the population covariance matrix (Tanaka & Huba, 1989). A high GFI value, closer to 1.0, indicates a greater model fit. The GFI = .84 of the SEEM also suggested a good model fit.

Overall, results of the confirmatory factor analysis suggest that the factor structure of the SEEM, originally derived from a college population of young adults, remained a good model when tested in the community sample. Three of the five indices suggested a good model fit, while the fourth and fifth indices (i.e., NFI and RMSEA) suggested a marginal/good fit. Therefore, Hypothesis 1 was supported; the fit indices suggested good model fit of the original four-factor SEEM structure in the community sample.

Bivariate Correlations

The correlations between the measure of current physical activity, physical activity experience, BMI, and SEEM are reported in Table 4. To examine Hypothesis 2, the convergent validity of the SEEM in the community sample: The SEEM scores were correlated with lifetime activity items, physical activity, and BMI. For each of the four factors, high scores indicated

more adaptive outcome expectancies; therefore, higher expectancy scores would be expected to be related to higher rates of physical activity. Overall, significant positive correlations were found between each of the four factors and current physical activity (r = .27 to r = .50, p < .001). The SEEM composite scores showed a strong positive correlation with current physical activity rates (r = .51, p < .001). Therefore, the results support Hypothesis 2 and the validity of the SEEM in the community sample of young adults through strong correlations with current physical activity, BMI, and exercise history.

Table 4. *SEEM Factor Correlations*

	SEEM				
	Composite	*Positive*	*Negative*	*Social*	*Practical*
	r	*r*	*r*	*r*	*r*
Current PA	.51**	.50**	.48**	.27**	.38**
Sports Hx	.29**	.22**	.24**	.27**	.25**
Fitness Hx	.28**	.31**	.17*	.16*	.34**
Alternative Hx	.24**	.15*	.21**	.28**	.13*
Lifestyle Hx	.10	.08	.05	.11	.14*
BMI	-.12*	-.11	-.18*	-.03	-.02

Note. Current Physical Activity (PA) = # of days exercised in past 7 days, *alpha < .05 **alpha < .001.

Moderating Effect Analyses

Hierarchical Regression Analyses

A hierarchical regression analysis was completed to test Hypothesis 3: that self-reported experience with physical activity will moderate (i.e., enhance) the relationship between outcome expectancy and physical activity. Specifically, predictor variables (i.e., physical activity experience and the Swan Exercise Expectancy Measure scores) were centered to enhance the interpretation of the results and reduce multicolinearity. Current physical activity was first regressed on centered SEEM scores in Model 1 (Table 5). In Model 2, the centered physical

activity history variable was added. The interaction term was added in the Model 3 to assess if the interaction term explained any variance over and above the two main effects.

The results of the multiple regression indicated a significant main effect of SEEM scores and exercise history, the two predictors explained 27.4% of the variance in physical activity (R^2 = .27, F (2,299) = 56.17, p <.001, Table 5). Exercise history significantly predicted physical activity (β = .13, p =.02), as did SEEM scores (β = .47, p < .001). Further examination of the relationship between the variables did not support an interaction effect between exercise histories and SEEM scores.

Table 5. *Regressing Current Physical Activity[d] (PA) on Physical Activity Hx and SEEM*

Model	*R*	R^2	Adjusted R^2	ΔR^2	ΔF	*p*
1	.51[a]	.26	.26	.26	104.20	.00
2	.48[b]	.27	.27	.02	6.30	.01
3	.47[c]	.27	.27	.00	.01	.94

Note. Δ = change.
a. Predictors: SEEM (Swan Exercise Expectancy Measure)
b. Predictors: SEEM, PA History (Hx)
c Predictors: SEEM, PA Hx, Interaction term
d. Dependent Variable: Current Physical Activity = On how many of the past 7 days did you exercise or participate in exerting physical activity?

Hypothesis 3, therefore, was not supported, as no significant interaction effect was found. A main effect of exercise history was, however, found to predict a significant amount of variance beyond that explained by the SEEM scores ($R^2\Delta$= .02, p =.01). In the regression equation, exercise history was found to explain a small, but significant, amount of unique variance in physical activity rate when entered with SEEM scores.

Alternative Model Exploration

Additional Confirmatory Factor Analyses

Examination of the correlations between the latent variables (i.e., the factors) in the CFA, again, found strong correlations (r = .51 to -.93), indicating the latent variables in the model were highly interrelated (Table 6).

In order to provide a possible explanation for the correlations among the four factors, alternative models were examined. A three-factor model and a second-order model were examined and compared to the fit of the original four factor model of the SEEM. The structure of the three-factor model combined the two most correlated factors (positive and negative) into one factor, resulting in a three-factor structure, Positive/Negative, Social, and Practical. As with the original model, one path was fixed to have a value of 1.0 from each of the three factors.

Table 6. *Factor Correlation Matrix (Φ)*

Factor	Negative	Positive	Social
Positive	.85		
Social	.51	.59	
Practical	.74	.93	.58

Each SEEM item was then, fixed to load on one first-order factor. The three-factor model did not improve the model fit (Table 7) and was a less parsimonious model; therefore, it was discarded. CFA results showed that both the original SEEM four factor model and a second order model fit the data well, however, because the later model is more parsimonious it may be a superior factor structure.

The second order model that was tested was a higher-order model with a second order factor structure overlaying the original four factors (i.e., positive, negative, social, and practical)

of the SEEM (Appendix F, Figure 1 for the second order SEEM model). The scale of the second order factor was set the same as the first-order factors, by fixing one path to have a value of 1.0 from the first-order factors. Each SEEM item was fixed to load on one first-order factor; therefore, the factor loadings should be interpreted as estimated correlations between the item and the factor. The second order loadings are interpreted in a similar manner, with higher factor loadings indicating stronger relationship between the single-order factor and the second-order factor.

To assess the fit of each model, a chi-square test (χ^2), the normed fit index (NFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the goodness-of-fit index (GFI) were used. Model fit results are displayed in Table 7 along with those of the original four-factor model. Further details and factor loadings, however, are presented for the preferred, second order model.

Table 7. *Goodness-of-Fit Indices for Alternative CFA Models*

Model	χ^2	*df*	*p*	χ^2/df	*RMSEA*	*GFI*	*NFI*	*CFI*
Four-factor Model	797.91	344	<.001	2.32	.07	.84	.94	.97
Three-factor Model	1146.53	347	<.001	3.30	.10	.74	.92	.94
Second-order Model	800.64	346	<.001	2.31	.07	.84	.94	.97

Note. *N* =300. *RMSEA* = root mean square error of approximation; χ^2/df = chi-squared *df* ratio; *GFI* = goodness-of-fit index; *CFI* = comparative fit index; *NFI* = normed fit index.

Both the first-order factors and the second-order factor loadings for the second-order factor model are presented in Table 8. The eight Positive expectancies factor loadings ranged from .79 (“Happy”) to .47 (“Process thoughts”) showing the lowest mean loading, M = .67, of the factors. Loadings on the ten indicators of Negative expectancies ranged from .75 (“Awkward”) to .31 (“Strains bones and joints”), M = .58. Loadings on the five indicators of

Social expectancies ranged from .86 ("Awkward") to .72 ("Strains bones and joints") showing the highest mean, M = .78 of all factors. Loadings of the final factor, Practical, ranged from .77 ("Optimistic") to .55 ("Practical"), M = .66. The factor loadings from the first-order factor model are not presented here, however, they were very similar to those shown in Table 7; the mean loading of each factor was equivalent across the two models. The loadings of the four first-order factors on the higher-order construct were all substantial and ranged from .59 ("Social") to 1.0 ("Positive"), *M* = .84. Exploration of alternative models in comparison to the original model structure suggests that the second order model may be a superior factor structure for the SEEM.

Table 8. *Factor Loadings for the Second-Order CFA Model*

				E			
Positive		Negative		Social		Practical	
1.0		.84		.59		.91	
Personal (1)*	.75	Discouraged (2)	.70	Meet people (3)	.81	Sleep (8)	.68
Process (5)	.47	Discontent (4)	.65	Gatherings (10)	.86	Daily Act. (7)	.69
Attractive (6)	.62	Tired (9)	.51	Family (13)	.73	Optimistic (11)	.77
Time (15)	.63	Relax (12)	.57	Fun (20)	.78	Practical (14)	.55
Forward (19)	.75	Pain (16)	.47	Unique (25)	.72	Wellbeing (17)	.60
Focused. (24)	.77	Awkward (18)	.75				
Autonomy (27)	.60	Strains (21)	.31				
Happy (28)	.79	Keep (22)	.41				
		Irritable (23)	.68				
		Boring (26)	.71				

Note. N =300, factor loadings = standardized solution, *SEEM item # in parentheses.

Summary

The results of the present study support two of the three hypotheses. Hypothesis 1 was supported with good fit of the original four-factor SEEM structure in the community sample. Three of five fit indices suggesting good model fit, and the remaining two suggesting marginal/good fit. In addition, Hypothesis 2 was supported. Validity for the SEEM was demonstrated in the community sample of young adults through strong correlations with current physical activity, BMI, and exercise history. Hypothesis 3 was not supported; no significant interaction effect was found. Self-reported experience did not moderate (i.e., enhance) the relationship between outcome expectancy and physical activity. Additional examination of the factor structure of the SEEM indicated large inter-correlations between the factors of the original four-factor structure. In order to explain these intercorrelations exploration of alternative models identified a more parsimonious second-order model. The second order model demonstrate comparable fit when compared to the original model and was more parsimonious, therefore, indicating that it may be a more advantageous factor structure for the SEEM.

CHAPTER IV

DISCUSSION

In the interest of fostering physical activity in young adult populations this study sought to build upon the conceptualization and measurement of the outcome expectancy construct and improve the application of the construct in clinical and research settings. The findings of the present study support two of the three hypotheses and advance the understanding and measurement of the outcome expectancy, health behavior construct for young adults.

Physical Activity in a Community Sample

As the health behavior research demonstrates, any level of physical activity shows positive mental and physical health benefits (U.S. DHHS, 1996). To achieve most of the health benefits, however, these levels should meet the recommended 150-300 minutes of moderate activity per week. The results of the present study demonstrated that 63% of the young adults in the general community sample do not meet the recommended level of exercise. Of the sample, 38% described their usual activity level as "Low" or "Inactive." In light of the recommendations and research findings, these rates are likely too low for these individuals to achieve most of the health benefits physical activity can offer.

These low levels of physical activity are concerning for several reasons. First, without an adequate level of physical activity, these young adults will be at a greater risk for developing current and future health problems. There is substantial support that physical activity improves cardiovascular, musculature, cognitive and immune functioning, as well as, reduces negative health concerns, such as high blood pressure, stress, and emotional/psychological problems (U.S. DHHS, 1996). Physical activity rates below the recommended level, however, may not be

enough to achieve these health benefits and may actually negatively influence these young adults' current quality of life and establish trajectories that will place them at risk for developing future problems.

Being at a greater health risk is particularly concerning given that non-communicable, and largely preventative, diseases are influencing individuals at younger ages (World Health Organization, 2004). It is especially concerning given that these diseases are now found to be the main cause of death and mortality in the United States. In addition, a greater risk for negative health consequences, which may be preventable with lifestyle changes, will likely result in higher personal-health-costs, and an increased societal cost of healthcare and other expenses (e.g., decreased occupational productivity).

Another reason why these low activity levels are concerning is that during the young adult years individuals are developing lifestyle habits that will most likely persist into adulthood and influence not only their future health, but also that of future generations. Given that physical activity levels are shown to decrease over an individual's lifespan (Caspersen, Pereira, & Curran, 2000), these individuals' already low levels will most likely drop even lower and result in more negative health concerns. As many health consequences, positive and negative, are distal, these young adults are at a greater risk of continuing on a path characterized by low exercise, not realizing the negative outcomes of their habits until it is too late. In addition, if these poor habits persist and this young adult generation does not develop healthier lifestyles then future generations will have even fewer healthy role models.

The low rates of physical activity that were found in the current sample substantiate the need to understand what factors motivate young adults to become engaged and stay engaged in physical activities. Unless effective interventions target these unhealthy habits, obesity and lack

of physical activity will be major factors attenuating future life expectancy (Olshansky et al., 2005). The Swan Physical Activity Expectancy Measure demonstrated positive results in the present study, supporting its potential as a clinical and research tool that can be used to improve young adults' physical activity participation.

Physical Activity Outcome Expectancies

Given the diverse benefits of physical activity, concerted efforts should be made to target this health behavior in high-risk populations, such as young adults. There are several social cognitive theories that provide guidance to clinicians in promoting health behaviors. The parallel between these theories depict outcome expectancies as an important factor for increasing physical activity behaviors; however, the conceptualization and measurement of outcome expectancies is lacking. Specifically in young adult populations, there is a need for further research and construct development (Williams, et al., 2005).

Outcome expectancies are the anticipated consequences of engaging in a behavior and are well documented in alcohol and substance use, risk-taking behaviors, gambling, treatment outcomes, work motivation, pain management, and experimenter bias (Andriessen & Vrije, 1975; Dolce, Crocker, & Doleys, 1986; Jones, Corbin, & Fromme, 2001; Kwekkeboom, 2001; Meyer, Pilkonis, Krupnick, Egan, Simmens, & Sotsky, 2002; Silverman, 1968). The construct has also played an important role in the development of cognitive-behavioral explanations of physical activity, with expectancies demonstrating positive correlations with physical activity rates (Williams et al., 2005). For example, if an individual participates in physical activity, the positive outcomes of being active (e.g., improved mental and physical health) will then reinforce the behavior. Given these positive consequences of being active, the individual will anticipate

that future physical activity behavior will have a similar outcome. Thus, positive, physical activity outcome expectancies would function to increase the likelihood that the individual will participate in the activity again (the inverse would be true of negative expectancies).

Health behavior research agrees that outcome expectancies are a useful construct that can be used to target physical activity behavior. In this research, however, the physical activity outcome expectancy construct has predominantly been included in studies that examine broad social cognitive models, and fewer studies have focused on the refining the conceptualization of the construct for specific populations (Williams et al., 2005). In fact, this research has found weaker correlations between outcome expectancies and current physical activity in young adult populations. Thus, a more detailed understanding of the construct and its measurement was needed to better target health behavior in young adult populations.

The SEEM in a Community Sample

The Swan Exercise Expectancy Measure (SEEM) was developed to target young adults' physical activity outcome expectancies and was initially validated in a Midwestern-college sample (Swan, 2009). Before the clinical or research application of the measure, however, it was necessary to examine the validity of the SEEM in a community sample of young adults. The main purpose of the current study was to examine the convergent validity and generalizability of the SEEM in a diverse, community sample of young adults ages 18-30. This study also sought to progress the understanding of the exercise expectancy construct by examining the possible moderating effect of exercise history in relation to current physical activity rates. In addition, the refinement of the SEEM structure was examined by testing alternative models.

The results of the present study supported two of the three proposed hypotheses. Hypothesis 1 was supported with three of five fit indices suggesting good model fit, and the remaining two suggesting marginal/good fit of the original four-factor SEEM structure in the community sample. In addition, Hypothesis 2 was supported. The convergent validity for the SEEM was demonstrated in the community sample of young adults through strong correlations with current physical activity, BMI, and exercise history. These findings advance the conceptualization of the outcome expectancy construct by offering a framework (i.e., an empirically supported factor structure) and an effective measurement tool for the young adult population. In consideration of these, and past findings (Swan, 2009), the readiness of SEEM is supported for use in research and clinical settings as it has now demonstrated empirical support in both college and community samples of young adults.

The original SEEM structure includes factors that measure positive expectancies, negative expectancies, social expectancies, and practical expectancies. Conceptualization of the physical activity outcome expectancy construct according to this model provides an empirically derived framework to understand the different elements that are important for a young adult population. Having this framework provides an operationalization of the construct that can be applied in research and that can inform health professionals of important domains that may be targeted to change physical activity attitudes and habits in young adults.

A clear framework and measurement of physical activity outcome expectancies aids the application and understanding of the construct in both research and clinical settings. For example in a clinical setting, if an individual was found to have few expectations of positive social outcomes for physical activity, this might be identified as an area of growth that can then be targeted in treatment. For example, if the individual's SEEM responses indicated that they

disagreed with the item, "Physical activities are a useful way to meet people." This expectation might then become a target in treatment. An intervention might work to encourage the individual to attend group physical activities and explore/focus on the positive outcomes and experiences, therefore, enhancing the individual's development of a supportive social outcome expectancy. Alternatively, if an individual agreed with the SEEM item, "Physical activities are a nice way to spend time with family and friends", however, the individual reported not engaging in activities with friends, this may also inform treatment. Encouraging the individual to seek out activities with friends or to learn a new activity with a family member would help to support and capitalize on the already established social expectation.

In research, it is advantageous to have a clear understanding of the constructs before the research is extended to examine how the constructs functions within general models of health behavior. The majority of physical activity, outcome expectancy research has focused on outcome expectancies within broad social cognitive models, and has demonstrated weak correlations in young adult populations (Williams, et al., 2005). Therefore, this study advanced the understanding of the construct by examining the focused measurement and conceptualization of the construct specifically for a young adult population.

A more detailed understanding of the different factors related to physical activity outcome expectancies may then be used to inform public policy or promotion of health behaviors. For example, if it is known that negative expectations decrease the likelihood of behavior, advertisements might target and challenge some of the commonly held negative expectancies. For example, advertisements might emphasize that the immediate effects of physical activity may be feeling tired, awkward, and sweaty, however, the more distal effects are increased confidence, health, and attractiveness. An advertisement might also help to decrease

the strength of the negative expectation and, inversely, strengthen the positive expectations helping individuals keep the more distal, positive outcomes in mind.

An important caveat in the conceptualization and application of these findings is the correlational nature of outcome expectancy research. Interpretation of outcome expectancy research findings suggest covariation or relationships between the variables; however, making causal assertions (e.g., outcome expectancies alter physical activity behavior) is beyond the scope of the research. The development and empirical support of theories, such as cognitive behavioral theories, explain how these constructs relate to one another and offer a framework for interpreting and applying the data. Research and theories, however, are not able to address all possible extraneous variables, personal differences, or the influence of time, and novel factors. Therefore, although this and other similar research can provide useful ways to target behavioral change, it is important to interpret and apply these findings within the scope of the experimental design.

Exercise Experience and Outcome Expectancies

Along with gaining support for the original SEEM factor structure, the examination of the effect of exercise experience or history also provided insight into the outcome expectancy-physical activity relationship. In both alcohol and smoking expectancies research, the strength of the relationship between expectancies and behavior is moderated by level of experience; however, this relationship has not been established for physical activity outcome expectancies (Leigh, 1989; Wahl, et al., 2005). The present study sought to examine a possible moderating effect (i.e., enhancing effects) of individuals' past exercise experiences on the outcome

expectancy-physical activity relationship. In the present study, however, no interaction effect was found and Hypothesis 3 was not supported.

In the current data, self-reported experience was not found to moderate (i.e., enhance) the relationship between outcome expectancy and physical activity. Regression analyses, however, did find that exercise history explained a small, but significant amount of unique variance in current physical activity rates above that explained by the SEEM. These findings are inconsistent with the theoretical explanation that individuals who have fewer experiences have outcome expectancies that remain weaker over time (Katz, Fromme, & D'Amicol, 2000), or with the literature that has found a moderating effect in alcohol and smoking expectancies (Leigh, 1989; Wahl, et al., 2005). Instead, it appears that the relationship between expectations and current activity remains similar across different activity histories. Thus, outcome expectancies were found to have similar positive correlations with physical activity for individuals with limited histories (i.e., have participated in a limited number of activities) as for individuals with diverse exercise histories (i.e., have tried many different activities). These findings are, however, consistent with the outcome expectancy research that indicates that outcome expectancies can begin to form and effect future behavior, even before an individual had personal experience, through social learning (Aas, Leigh, Anderssen, & Jakobsen, 1998).

In the current study, it was hypothesized that the relationship might vary at different levels of exercise history, in support of the argument that experience alters outcome expectancies and their relation to behavior. However, the findings suggest that outcome expectancies remain influential and important even for individuals who have an extensive exercise history. These findings support the theory that current behavior may function in a semiautomatic manner; influenced by both automatic behavioral processes (e.g., experience) and conscious cognitive

planning (e.g., outcome expectancies) (Ajzen, 2002). Although the interaction was not significant, the regression analysis did suggest that exercise history explained a small, but significant amount of unique variance in current physical activity rates above that explained by the SEEM. This suggests that habits did not take over and decrease the influence of cognitive processes (i.e., outcome expectancies), nor did they increase the influence of cognitive processes, rather both behavioral (i.e., experience) and cognitive processes were found to explain a significant amount of unique variance in current physical activity.

Exploration of Alternative SEEM Models

In the initial studies, during the creation and refinement of the SEEM, substantial intercorrelations were found between the four factors (i.e., positive, negative, social, and practical) (Swan, 2009). Given that these factors were theorized to be distinct, the high amount of shared variance between the factors was concerning. In addition to examining the validity of the SEEM in a community sample, this study sought to explore alternative models in an effort to produce the best possible SEEM structure and continue to refine the operationalization of outcome expectancies for young adults.

Exploration of alternative models, in comparison to the original four-factor structure of the SEEM yielded interesting findings. It was anticipated that the structure of the SEEM would generalize to a more heterogeneous sample from a community population and the related Hypothesis 1 was supported. The original single-order factor structure of the SEEM demonstrated adequate fit; however, large inter-correlations were again found between the factors of the original four-factor structure. In the exploration of alternative models, a more

parsimonious second-order model was found to demonstrate comparable fit when compared to the original SEEM model.

This second-order model suggests that that the four, hypothesized as somewhat distinct factors (Positive, Negative, Social, and Practical) may be accounted for by a common underlying higher-order construct. This second-order model is advantageous because it explains the strong correlations between the four factors, uses fewer parameters, and separates more explained variance from error variance. Identification of a higher order construct within the second-order factor structure for physical activity outcome expectancies suggests that the construct may need further research in order to operationalization and define this higher order construct.

In the examination of the second-order model positive expectancies were found to load strongest on the higher-order factor. This high loading suggests that it is the most related of the first-order factors for young adults. This is not surprising since positive expectancies have been found to be a strong motivator, encouraging individuals to engage in and repeat behaviors (i.e., physical activity) (Aas, Leigh, Anderssen, & Jakobsen, 1998). Noting that the positive factor is the most related might help guide the conceptualization of the higher-order construct. These findings, and the identification of the second order structure of the SEEM serve to refine the measurement and conceptualization of outcome expectancies for young adults.

Limitations

In the current study, the use of internet to advertise and collect responses presented both advantages disadvantages. Advantages of using the internet for individuals to complete the study included, removing the possibility of error due to manual entry and scoring of data. Advertising

through the internet also allowed the sampling of a more diverse group of young adults, representing over 30 different states across most major regions of the country.

Disadvantages of using the internet included the tradeoff of having less methodological control over participants. This was found to influence the current study in that some individuals accessed the website but did not even start or did not complete the surveys. Further, many individuals who accessed the site and completed the survey did not meet the age criteria (i.e., age > 30 or < 18 years old) or they did not correctly answer the validity item correctly. Therefore, the data that was screened out of inclusion (n = 101) may seem large; however, it was expected given the use of internet advertisement and collection of data. In consideration of the strengths and weaknesses of using internet methods, and the efforts that were taken to reduce the bias by recruiting participants through various forms of advertisements, the benefits are still thought to have outweighed the costs.

Another limitation in the present study was in how exercise history was operationalized. An inherent difficulty in health behavior research is the complexities of operationalizing and measuring physical activity (Wenk, 2002). The present study focused on the *number* of activities; however, this does not address how much *time* an individual has dedicated to these activities. Expectations may develop differently if an extensive amount of time has been dedicated to one specific activity (e.g., the individual may be more likely to have see the long-term benefits and rewards of activity over time) vs. trying many activities that may not have required a substantial amount of time. Asking individuals to report details such as the number of hours they participated in activities in their past, however, raised the concerned of the questionable reliability of such detailed self-reported, historical information. This was judged to introduce more error than was appropriate in the current study. Future studies, however, might

address this issue by creating methodology that improves the validity of collecting this type of detailed historical information.

Future Research

Review of the outcome expectancy literature suggests it may be beneficial for future research to explore other possible moderating and mediating variables. For example, in the final second-order factor structure, positive expectancies were found to have the highest loading on the higher order construct. Future research might examine if there is a difference in the salience or accessibility of different types of cognitive expectancies. Whether or not individuals have positive or negative experiences with physical activities may not only determine the type of expectation (positive or negative) but also may influence how readily the expectation is accessed.

Future research might also examine variables related to the experience, the consequences, or the environment of the physical activity. Outcome expectations might vary as a function of the intensity of the experience, the proximity of the consequence, or other variables in the environment. For example, if the environment that the physical activity is performed in is unpredictable the outcome may also be judged as less predictable or the strength of the relationship between the outcome expectancy and behavior may be weakened. An unpredictable environment may also prevent individuals from attributing the consequence strictly to the activity; individuals may attribute consequences to the environmental factors instead.

Future research could also examine group differences in outcome expectancies. Given that activity choices and rates vary between and within different populations, the function of outcome expectancies may vary for these different groups as well. For example, research might

examine gender differences, as well as the influence of SES, geographical locations, and ethnicity on expectations.

Finally, the present study identified a new and more parsimonious model structure for the SEEM. It is recommended that future studies examine the operationalization and function of the higher order factor that was identified in the present study. Research might also examine if this factor structure is advantageous for other populations (e.g., adolescents or older adults).

In addition, examination of the discriminant validity of the four SEEM component scales would support the validity and clinical application of the measure. Future research might examine the activity habits of individuals to see if specific physical activity habits are associated with greater scores on the related expectancies factor scales. For instance, an individual who participates in many group activities would be expected to score higher on the social expectancy subscale than an individual who participates in solitary activities.

Conclusion

In conclusion, although there are some limitations to the present research, the support for validity and generalizability of the SEEM in a community sample was consistent and appears to overshadow the criticisms. In addition, the study was able to build upon the conceptualization of physical activity outcome expectancies for a young adult population. The refinement and validation of the SEEM, along with a focused examination of the construct of physical activity outcome expectancies opens the door for future research and clinical application.

APPENDICES

APPENDIX A

CONSENT FORM

Title: Moderating Variables and Validity of the Swan Exercise Expectancy Measure (SEEM) in a Community Sample
Primary Investigator: Natasha Swan, Clinical Psychology Graduate Student, n.swan@cmich.edu, (989)774-3147
Advisor: Donna Wollerman Ronan, Director, Psychological Training and Consultation Center, ronan1dm@cmich.edu, (989) 774-2284

Introductory Statement
Thank you for your interest and willingness to participate in this psychological study. Details concerning the study are provided in this consent document. If you have any questions about the study or this consent form, please contact the principal investigator, Natasha Swan (contact information provided above). Note, you must be 18 years or older to participate in this study.

What is the purpose of this study?
The purpose of this study is to identify common beliefs about physical activity to examine how these beliefs influence activity behavior.

What will I do in this study?
Participation involves completing several brief questionnaires. These measures will ask you a variety of questions ranging from simple questions about yourself (i.e., your age or height) to questions about your experience and attitudes toward physical activity or exercise.

How long will it take me to do this?
Completion of this survey takes approximately 10 minutes.

Are there any risks of participating in the study?
The only risks and/or discomfort involved with participation are any feelings you may have as a result of thinking about your exercise habits. Any concerns about such resulting feelings should be brought to the principle investigator. If necessary, referrals can be made to CMU's Psychological Training and Consultation Center.

What are the benefits of participating in the study?
By participating, you will have the opportunity to win a large prize (e.g., a gift certificate) in a raffle. Completing this study also provides you with an opportunity to contribute to knowledge about exercise behavior and experience scientific research firsthand.

Will anyone know what I do or say in this study (Confidentiality)?
The results of your participation will be confidential, only the principal investigator (and faculty mentor) will have access to the information. Overall results from the study may be presented in scientific reports or presentations; however, the information will not be released in an

individually identifiable form without prior consent unless required by law.

Will I receive any compensation for participation?
For participating you will earn an entry in a drawing for a large prize (e.g., a gift certificate) in a raffle.

Is there a different way for me to receive this compensation or the benefits of this study?
Entry into the drawing is based on voluntary participation in the survey. However, if there is any reason why you are prohibited from participating (e.g., you do not have internet access), please contact the principal investigator to discuss possible alternatives (e.g., arranging an in-person appointment or the mail delivery of a paper-and-pencil format of the survey.

Who can I contact for information about this study?
If you have any questions or concerns please contact the primary investigator (Natasha Swan, Clinical Psychology Graduate Student, n.swan@cmich.edu, (989)774-3147) or her faculty advisor (Donna Wollerman Ronan, Director of the Psychological Training and Consultation Center, ronan1dm@cmich.edu, (989) 774-2284).

If you would like a copy of this form to be sent to you, please choose Yes, and provide your email address.

_No, I do not need a copy of this form sent to me
_Yes, I would like a copy of this form sent to the email address below.

You are free to refuse to participate in this research project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this research project.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

For the Research Investigator— My typed name and the date below is my signature indicating I have presented this subject the procedure(s) described above and the risks involved; I believe he/she understands the contents of the consent document and is competent to give legally effective and informed consent.

Natasha Swan- October 3, 2009- Donna Wollerman Ronan- October 3, 2009
Signature of Principal Investigator, Date -Signature of Faculty Advisor, Date

Typing my name and the date below is my signature indicating that all my questions have been answered and I agree to participate in the project as described above.

APPENDIX B

DEMOGRAPHIC FORM

1. Age:_____

2. Gender: □ Male □ Female

3. Ethnicity: □ Hispanic/Latino □Not Hispanic/Latino

4. Racial Background. Select one or more as appropriate:

□ American Indian /Alaska Native

□ Asian

□ Black/African American

□ Native Hawaiian/Other Pacific Islander

□ White

5. Occupation:

□ Full-time employment □ Part-time employment □ Student □ Unemployed

6. Height _____ft_____inches

7. Weight_____lbs.

8. Health Status:

Please choose an option that best describes your current health status:

□ Excellent □ Good □ Average □ Poor

Do you currently have a health condition that prevents you from participating in vigorous physical activity?

□Yes □No

If Yes, please provide a brief description:

_____

_____

10. On how many of the past 7 days did you exercise or participate in exerting physical activity?

_____

(Examples of physical activities include recreational activities and hobbies, competitive and leisure sports, aerobic exercise, and non-aerobic exercise).

APPENDIX C

PHYSICAL ACTIVITY RECORD

PLEASE COMPLETE THE FOLLOWING ITEMS ACCORDING TO YOUR HISTORY OF ACTIVITY PARTICIPATION (not including school PE classes)

Please place a check mark for each activity you have experienced. Please specify if you participated in the activity in your past and/or if you currently participate in the activity.

SPORTS (i.e., activities or athletics that follow defined rules; include both competitive and leisure participation)

	Past	Present
ACTIVITY		
Badminton		
Baseball/softball		
Basketball		
Boxing		
Cheerleading		
Cricket		
Curling		
Cycling		
Dancing		
Diving		
Fencing		
Field hockey		
Football		
Golf		
Gymnastics		
Handball		
Hockey		
Horseback riding		
Kickball		
Lacrosse		
Martial Arts		
Raquetball		
Rowing		
Rugby		
Skateboarding		
Skating/Rollerblading		
Soccer		
Squash		
Swimming		
Tennis		
Ultimate Frisbee		
Volleyball		
Water Polo		
Wrestling		
Other:		

Active Living (i.e., physical activities that are integrated into everyday life)

	Past	Present
ACTIVITY		
Gardening		
Lawn Mowing		
Walking		
Bicycling (Commuting)		
Housework		
Chores		
Other:		

Fitness Activities (i.e., planned exercise that is designed to improve physical condition)

	Past	Present
ACTIVITY		
Aerobics		
Calisthenics		
Circuit Training		
Cycling—Indoor/ Stationary		
Fitness Training (Exercise Machines)		
Jogging		
Kickboxing		
Pilates		
Swimming		
Tae Bo		
Tai Chi/ Qigong		
Weightlifting (strength/resistance training)		
Yoga		

Alternative Pursuits (i.e., recreational interests that are often done in an outdoor setting)

	Past	Present
ACTIVITY		
Archery		
Backpacking		
Canoeing		
Disc Golf		
Geocaching		
Hiking		
Kayaking		
Mountain biking		
Rock climbing		
Sailing/Yachting		
Scuba Diving		
Snow-Skiing (downhill/cross		

country)		
Snowboarding		
Snowshoeing		
Tobogganing, Sledding, Tubing		
Water-Skiing/Wake boarding		
Windsurfing/ Sailboarding		
Other:		

Please describe your typical amount of physical activity per week.

Please Choose One		Definition
□	**Inactivity**	Usually no or only occasional activity beyond daily living requirements
□	**Low activity**	Usually at least some activity above normal living demands, but not exceeding 150 minutes of moderate activity a week (≈20- 30 minutes a day)
□	**Moderate activity**	Usually about 150-300 minutes of moderate activity per week (≈40 minutes a day)
□	**High activity**	Usually greater than 300 minutes of moderate intensity activity per week (>45 minutes a day)

Please describe your usual pattern of physical activity.

Please Choose One		Definition
□	**Consistent Activity**	A reliable pattern of activity with only minor or occasional changes in amount of weekly activity defined above
□	**Inconsistent Activity**	An up-and-down pattern of activity characterized by frequent or extreme shifts between two or more of the above choices

APPENDIX D

SWAN EXERCISE EXPECTANCY MEASURE (SEEM)

The term *physical activity* includes all kinds of behavior that requires physical exertion this includes recreational activities and hobbies, competitive and leisure sports, aerobic and non-aerobic exercising, among others.

Please reflect on your general physical activity and pick a number from the scale to show how much you agree or disagree with each statement.

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. Exercising makes me aim for my personal best.	1	2	3	4	5
2. While I am exercising, I am easily discouraged.	1	2	3	4	5
3. Physical activities are a useful way to meet people.	1	2	3	4	5
4. Physical activity makes me feel discontent with my body.	1	2	3	4	5
5. Exercising gives me opportunity to process my thoughts.	1	2	3	4	5
6. I feel more attractive after I have been physically active.	1	2	3	4	5
7. Physical activity keeps me fit enough to complete daily activities.	1	2	3	4	5
8. I sleep better when I exercise consistently.	1	2	3	4	5
9. If I exercise in the morning, I will be tired the rest of the day.	1	2	3	4	5
10. Physical activities are a great opportunity for social gatherings.	1	2	3	4	5
11. When I am physically active, I feel more optimistic about my life in general.	1	2	3	4	5
12. It is more enjoyable to relax than to be physically active.	1	2	3	4	5

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13. Physical activities are a nice way to spend time with family and friends.	1	2	3	4	5
14. Exercising is a practical way to improve my health.	1	2	3	4	5
15. Exercising is time I set aside for myself.	1	2	3	4	5
16. After physical activity, I feel increased physical pain.	1	2	3	4	5
17. Physical activity will improve my general wellbeing.	1	2	3	4	5
18. Exercising makes me feel awkward.	1	2	3	4	5
19. Physical activity gives me something to look forward to.	1	2	3	4	5
20. Physical activity is pleasurable because it is fun to be with people who enjoy being active.	1	2	3	4	5
21. Physical activity strains my bones and joints.	1	2	3	4	5
22. Physical activities will keep me from opportunities in other areas of my life.	1	2	3	4	5
23. Exercising makes me more irritable.	1	2	3	4	5
24. I am focused and ambitious while I am exercising.	1	2	3	4	5
25. Recreational activities are a great way to meet people.	1	2	3	4	5
26. Physical activity is boring.	1	2	3	4	5
27. Exercising gives me autonomy in other parts of my life.	1	2	3	4	5
28. When I am exercising, I feel happy.	1	2	3	4	5

APPENDIX E

CORRELATIONS

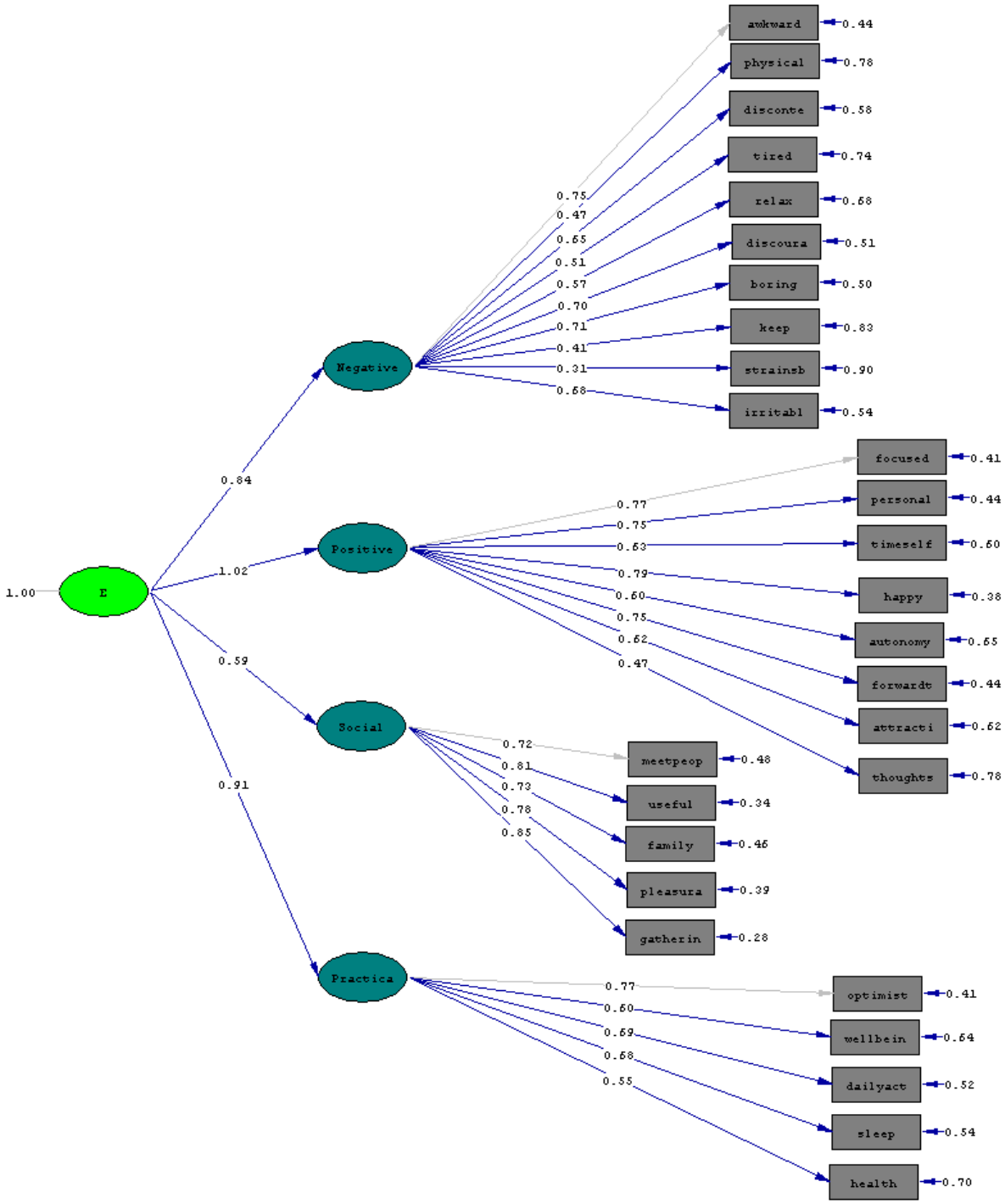
Correlations

		Current PA	1	2	3	4	5	6	7	8	9	10
1. SEEM	*r*	.509**										
	p	.000										
2. Negative Factor	*r*	.498**	.870**									
	p	.000	.000									
3. Positive Factor	*r*	.476**	.906**	.701**								
	p	.000	.000	.000								
4. Social Factor	*r*	.273**	.696**	.418**	.510**							
	p	.000	.000	.000	.000							
5. Practical Factor	*r*	.378**	.816**	.585**	.776**	.494**						
	p	.000	.000	.000	.000	.000						
6. BMI	*r*	-.148*	-.122*	-.179**	-.107	-.025	-.023					
	p	.011	.035	.002	.065	.666	.689					
7. Sports PA Hx	*r*	.235**	.288**	.240**	.218**	.266**	.247**	.004				
	p	.000	.000	.000	.000	.000	.000	.946				
8. Active living PA Hx	*r*	-.042	.098	.049	.076	.105	.136*	.072	.317**			
	p	.467	.091	.399	.188	.071	.018	.213	.000			
9. Fitness activities PA Hx	*r*	.271**	.279**	.170**	.307**	.164**	.338**	-.033	.468**	.336**		
	p	.000	.000	.003	.000	.004	.000	.573	.000	.000		
10. Alternative pursuits PA Hx	*r*	.270**	.237**	.213**	.153**	.277**	.134*	-.057	.511**	.328**	.372**	
	p	.000	.000	.000	.008	.000	.020	.322	.000	.000	.000	
11. PA Hx Total	*r*	.283**	.326**	.248**	.273**	.288**	.302**	-.015	.851**	.54**	.752**	.745**
	p	.000	.000	.000	.000	.000	.000	.801	.000	.000	.000	.000

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed). PA = Physical Activity, Current PA = # of days in the past 7.

APPENDIX F

SECOND ORDER SEEM MODEL



REFERENCES

Aas, H., Leigh, B., Anderssen, N., & Jakobsen, R. (1998). Two-year longitudinal study of alcohol expectancies and drinking among Norwegian adolescents. *Addiction, 93,* 373-384.

American College of Sports Medicine, The. (2008). Physical activity and public health guidelines. Retrieved on October 10, 2008 from http://www.acsm.org/AM/Template.cfm?Section=Home_Page&TEMPLATE=/CM/HTMLDisplay.cfm&CONTENTID=11398.

American Medical Association. (2006). *Code of medical ethics of the American Medical Association Council on Ethical and Judicial Affairs*. Chicago: American Medical Association.

Andel, R., Crowe, M., Pedersen, N. L., Fratiglioni, L., Johansson, B., & Gatz, M. (2008). Physical exercise at midlife and risk of dementia three decades later: A population-based study of Swedish twins. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 63,* 62-66.

Andriessen, J. H., & Vrije U. (1975). The expectancy theory and work motivation. *Netherlands Journal of Psychology, 30,* 453-491.

Annandale, E. (1998). *The sociology of health and medicine: A critical introduction*. Malden, MA : Polity Press.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50,* 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I. (2002). Residual effects of past on later behavior: Habituation and reasoned action perspectives. *Personality & Social Psychology Review, 6,* 107-122.

Armitage, C. J., & Conner, M. (2000). Social cognitive models and health behavior: A structured review. *Psychology & Health, 15,* 173-189.

Ayotte, B. J., Margrett, J. A., & Hicks-Patrick, J. (2010). Physical activity in middle-aged and young-old adults: The roles of self-efficacy, barriers, outcome expectancies, self-regulatory behaviors, and social support. *Journal of Health Psychology, 15,* 173-185.

Bandura, A. (1977a). *Social learning theory*. New York: General Learning Press.

Bandura, A. (1977b). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*, 1175-1184.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122-147.

Berk, M. (2007). Should we be targeting exercise as a routine mental health intervention? *Acta Neuropsychiatrica, 19*, 217-218.

Blair, S., LaMonte, M., & Nichaman, M. (2004). The evolution of physical activity recommendations: How much is enough? *American Journal of Clinical Nutrition, 79*, 913-920.

Bray, S., & Born, H (2004). Transition to university and vigorous physical activity: Implications for health and psychological well-being. *Journal of American College Health, 52*, 181-188.

Broocks, A., Bandelow, B., Pekrun, G., George, A., Meyer, T., Bartmann, U., Hillmer-Vogel, U., & Rüther, E. (1999). Comparison of aerobic exercise, clomipramine, and placebo in the treatment of panic disorder. *American Journal of Psychiatry, 156*, 1129-30.

Callaghan, P. (2004). Exercise: A neglected intervention in mental health care? *Journal of Psychiatric and Mental Health Nursing, 11*, 476-483.

Caspersen, C., Pereira, M., & Curran, K. (2000). Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Medicine and Science in Sports and Exercise, 32*, 1601-1609.

Caspersen, C. Powell, K., Christenson, G. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Report, 100*, 126-131.

Centers for Disease Control and Prevention (2007). *Health, United States, 2007*. DHHS Publication PHS. Washington DC: U.S. Government Printing Office.

Centers for Disease Control and Prevention (CDC). (2008a). *About BMI for adults*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Center for Disease Control and Prevention. (2008b). *Chronic disease prevention and health promotion.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention (2010). *Physical activity statistics, 2007.* Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Chakravarthy, M., & Booth, F. (2004). Eating, exercise, and "thrifty" genotypes: Connecting the dots toward an evolutionary understanding of modern chronic diseases. *Journal of Applied Physiology, 96,* 3-10.

Christiansen, B., Goldman, M., & Brown, S. (1985). The differential development of adolescent alcohol expectancies may predict adult alcoholism. *Addictive Behaviors, 10,* 299-306.

Cumsille, P., Sayer, A., & Graham, J. (2000). Percieved exposure to peer and adult drinking as predictors of growth in positive alcohol expectancies during adolescence. *Journal of Consulting and Clinical Psychology, 68,* 531-536.

Davis, C. L., Tomporowski, P. D., McDowell, J. E., Austin, B. P., Miller, P. H., Yanasak, N. E., Allison, J., & Naglieri, J. A. (2011). Exercise improves executive function and achievement and alters brain activation in overweight children: A randomized, controlled trial. *Health Psychology, 30,* 91-98.

Ding, Q., Vaynman, S., Souda, P., Whitelegge, J., and Gomez-Pinilla, F. (2006). Exercise affects energy metabolism and neural plasticity-related proteins in the hippocampus as revealed by proteomic analysis. *European Journal of Neuroscience, 24,* 1265–1276.

Dolce, J., Crocker, M., & Doleys, D. (1986). Prediction of outcome among chronic pain patients. *Behaviour Research and Therapy, 24,* 289-299.

Donaghy, M. E. (2007). Exercise can seriously improve your mental health: Fact or fiction? *Advances in Physiotherapy, 9,* 76-88.

Dzewaltowski, D. A. (1989). Toward a model of exercise motivation. *Journal of Sport & Exercise Psychology, 11,* 251-269.

Engel, George. (1977). The need for a new medical model: A challenge for the biomedical model. *Science, 196,* 129-135.

Fox, K. R. (1999). The influence of physical activity on mental well-being. *Public Health Nutrition, 2,* 411-418.

Hagger, M., Chatzixarantis, N., & Biddle, S. (2001). The influence of self-efficacy and past behavior on the physical activity intentions of young people. *Journal of Sports Science, 19,* 711-725.

Hill, J. O., Wyatt, H. R., Reed, G. W., & Peters, J. C. (2003). Obesity and the environment: Where do we go from here*? Science, 299, 853-855.*

Huang, T., Harris, K., Lee, R., Nazir, N., Born, W., & Kaur, H. (2003). Assessing overweight, obesity, diet and physical activity in college students. *Journal of American College Health, 52,* 83-86.

Janz, N., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11*, 1-47.

Jones, B., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction, 96*, 57-72.

Jones, M., & O'Beney, C. (2004). Promoting mental health through physical activity: Examples from practice. *Journal of Mental Health Promotion, 3,* 39-47.

Jöreskog, K. G., & Sörbom, D. (2006). *LISREL 8.80 for Windows.* Lincolnwood, IL: Scientific Software International.

Kahn, J., Huang, B., Gillman, M., Field, A., Austin, S., Colditz, G., & Frazier, A. (2008). Patterns and determinants of physical activity in U.S. adolescents. *Journal of Adolescent Health, 42*, 369-377.

Katz, E., Fromme, K., & D'Amico, E. (2000). Effects of outcome expectancies and personality on young adults' illicit drug use, heavy drinking, and risky sexual behavior. *Cognitive Therapy and Research, 24*, 1-22.

Kimm, S. Y. S., Glynn, N. W., Kriska, A. M., Barton, B. A., Kronsberg, S. S., Daniels, S. R. Crawford, P. B., Sabry, Z.I., & Liu, K. (2002). Decline in physical activity in black girls and white girls during adolescence. *New England Journal of Medicine, 347,* 709-715.

Kirk, D. (2005) Physical education, youth sport and lifelong participation: the importance of early learning experiences. *European Physical Education Review, 11*, 239-254.

Kraut, A., Melamed, S., Gofer, D., & Froom, P. (2003). Effect of school age sports on leisure time physical activity in adults: The CORDIS study. *Medicine and Science in Sports and Exercise, 35,* 2038-2042.

Kwekkeboom, K. (2001). Outcome expectancy and success with cognitive-behavioral interventions: The case of guided imagery. *Source Oncology Nursing Forum, 28*, 1125-32.
Lee, I. (2007). Dose-response relation between physical activity and fitness. *Journal of American Medical Association, 297,* 2137-2139.

Leigh, B. (1989). In search of the seven dwarves: Issues of measurement and meaning in alcohol expectancy research. *Psychological Bulletin, 105,* 361-373.

Leigh, B., & Stacy, A. (2004). Alcohol expectancies and drinking in different age groups. *Addiction, 99,* 215-227.

Maddux, J., & Rogers, R.W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology, 19,* 469-479.

Manitoba Education, Citizenship, and Youth. (2008). *OUT-of-class safety handbook: A resource for grades 9 to 12 physical education/health education*. Winnipeg, MB: Manitoba Education. , Retrieved June 2009 from www.edu.gov.mb.ca/k12/cur/physhlth/curriculum.html.

Marcus, B., Williams, D., Dubbert, P., Sallis, J., King, A., Yancey, A., Franklin, B., Buchner, D., Daniels, S., Claytor, R. (2006). Physical activity intervention studies: What we know and what we need to know: A scientific statement from the American heart association council on nutrition, physical activity, and metabolism (subcommittee on physical activity); council on cardiovascular disease in the young; and the interdisciplinary working group on quality of care and outcomes research. *Circulation, 114,* 2739-2752.

Meyer, B., Pilkonis, P., Krupnick, J., Egan, M., Simmens, S., & Sotsky, S. (2002). Treatment expectancies, patient alliance, and outcome: Further analyses from the national institute of mental health treatment of depression collaborative research program. *Journal of Consulting and Clinical Psychology, 70,* 1051-1055.

Meyerson, P., & Tryon, W. (2003). Validating Internet research: A test of the psychometric equivalence of Internet and in-person samples. *Behavior Research Methods, Instruments, & Computers, 35,* 614-620.

Murphy-Berman, V. & Sharma, R. (2001). Testing the assumptions of attribution theory in India. *The Journal of Social Psychology, 126,* 607-616.

Murray, C. J, & Lopez, A.D. (1997). Alternative projections of mortality and disability by cause 1990–2020: Global burden of disease study. *Lancet, 349,* 1498-1504.

Nader, P., Bradley, R., Houts, R., McRitchie, S., & O'Brien, M. (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association, 300,* 295-305.

Napolitano, M. A. (2000). Breaking barriers to increased physical activity. *The Physician and Sports Medicine, 28*, 88.

National Cancer Institute. *(2007). Cancer trends progress report—2007 update.* Retrieved October 22, 2008 from http://progressreport.cancer.gov.

National Cancer Institute. (2008). *Physical activity guidelines for Americans - funding opportunities & research resources for researchers.* Retrieved October 3, 2009 from http://appliedresearch.cancer.gov/funding/pa_guidelines.html.

National Institute for Clinical Excellence. (2004). *Depression: Management of depression in primary care*. London: NHS. Retrieved October 11, 2008, from, http://www.nice.org.uk/nicemedia/pdf/CG23fullguideline.pdf.

Neel, J. V. (1962). Diabetes Mellitus a "thrifty" genotype rendered detrimental by "progress"? *American Journal of Human Genetics, 14*, 352-353.

Norman, P., Conner, M., & Bell, R. (2000). The theory of planned behaviour and exercise: Evidence for the moderating role of past behaviour. *British Journal of Health Psychology, 35*, 249

Olshansky, S. J., Passaro, D. J., Ronald, C., Hershow, R. C., Layden, J., Carnes, B. A., Brody, J., Hayflick, L., Butler, R., Allison, D., & Ludwig, D. (2005). A potential decline in life expectancy in the United States in the 21st century. *New England Journal of Medicine, 352*, 1138-1145.

Paluska, S., & Schwenk, T. (2000). Physical activity and mental health: Current concepts. *Sports Medicine, 3*, 167-180.

Perkins, D. (2004). Childhood and adolescent sports participation as predictors of participation in sports and physical fitness activities during young adulthood. *Youth & Society, 35*, 495-520.

Perkins, J., Multhaup, K., Perkins, H., & Barton, C. (2008). Self-efficacy and participation in physical and social activity among older Adults in Spain and the United States. *The Gerontologist, 48*, 51-58.

Peters, J., Wyatt, H., Donahoo, W., & Hill, J. (2002). From instinct to intellect: The challenge of maintaining healthy weight in the modern world. *Obesity Reviews, 3*, 69-74.

Prochaska, J. O., & DiClemente, C. C. (1984). The transtheoretical approach: Crossing the traditional boundaries of therapy. Homewood, IL: Dow-Jones, Irwin.

Rogers, R. W. (1983) Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In: J. T. Cacioppo & R. E. Petty (Eds.), *Social psychophysiology* (pp. 153-176). New York: Guilford.

Rosenstock, I. M. (1966).Why people use health services. *Milbank Memorial Fund Quarterly, 44*, 94–127.

Rosenstock, I., Strecher, V., & Becker, M. (1988). Social learning theory and the health belief model. *Health Education Quarterly, 15*, 175-183.

Scully, D., Kremer, J., Meade, M. M., Graham, R., & Dudgeon, K. (1998). Physical exercise and psychological well being: A critical review. *British Journal of Sports Medicine, 32*, 111-120.

Seefeldt, V., Malina, R., & Clark, M. (2002). Factors affecting levels of physical activity in adults. *Sports Medicine, 32*, 143-168.

Simsek, Z., & Viega, J. F. (2001). A primer on internet organizational surveys. *Organizational Research Methods, 4*, 218-235.

Sher, K., Wood, M., Wood, P., & Raskin, G. (1996). Alcohol outcome expectancies and alcohol use: A latent variable cross-lagged panel study. *Journal of Abnormal Psychology, 105*, 561-574.

Silverman, I. (1968). The effects of experimenter outcome expectancy on latency of word association. *Journal of Clinical Psychology, 24*, 60-63.

Smith, G., Goldman, M., Greenbaum, P., & Christiansen, B. (1995). Expectancy for social facitiliation from drinking: The divergent paths of high-expectancy and low-expectancy adolescents. *Journal of Abnormal Psychology, 104*, 31-40.

Smith, G., & Strain J. (2002). George Engel's contribution to clinical psychiatry. *Australian and New Zealand Journal of Psychiatry, 36*, 458-466.

Stathopoulou, G., Powers, M., Berry, A., Smits, J., & Otto, M. (2006). Exercise interventions for mental health: A quantitative and qualitative review. *Clinical Psychology: Science and Practice, 13*, 179-193.

Steinhardt, M. A., & Dishman, R. K. (1989). Reliability and validity of expected outcomes and barriers for habitual physical activity. *Journal of Occupational Medicine, 31*, 536-546.

Stephens, J. M. (1942). Expectancy vs. effect-substitution as a general principle of reinforcement. *Psychological Review, 49*, 102-116.

Sturgeon, J. & Meer, J. (2006). *The first 50 years: The President's council on fitness revisits its roots and charts its future.* Rockville, MD: U.S. Department of Health and Human Services, President's Council on Fitness and Sports and Nutrition.

Swan, N. (2009). *The development and validation of the Swan Exercise Expectancy Measure (SEEM)* (Master's Thesis). Central Michigan University, Mount Pleasant, MI.

Tabachnick, B., & Fidell, L. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson Education, Inc.

Tammelin, T., Näyhä, S. Hills, A., & Järvelin, M.-R. (2003). Adolescent participation in sports and adult physical activity. *American Journal of Preventive Medicine, 24,* 22-28.

Taylor, W., Blair, S, Cummings, S., Wun C. C., & Malina, R. (1999). Childhood and adolescent physical activity patterns and adult physical activity. *Medicine and Science in Sports and Exercise, 31,* 118-123.

Thompson, A., Humbert, M., & Mirwald, R. (2003). A longitudinal study of the impact of childhood and adolescent physical activity experiences on adult physical activity perceptions and behaviors. *Qualitative Health Research, 13,* 358-377.

Tickle, E., Hull, J., Sargent J., & Dalton, M., & Heatherton, T. (2006). A structural equation model of social influences and exposure to media smoking on adolescent smoking. *Basic and Applied Social Psychology, 28,* 117–129.

Trost, S., Owen, N., Bauman, A., Sallis, J., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine and Science in Sports and Exercise, 34,* 1996-2001.

U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General.* Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General.

U.S. Department of Health and Human Services. (2008). *2008 Physical activity guidelines for Americans.* Office of Disease and Health Promotion. Rockville, MD: U.S. Department of Health and Human Services.

Wahl, S., Turner, L., Mermelstein, R., Flay, B. (2005). Adolescents' smoking expectancies: Psychometric properties and prediction of behavior change. *Nicotine & Tobacco Research, 7,* 613–623.

Wenk, G. (2002). *Physical activity assessments for health-related research.* Champaign, IL: Human Kinetics.

Wigfield, A., & Eccles, J. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology, 25,* 68–81.

Wilson, M.G., O'Hanlon, R., Prasad, S., Deighan, A., Macmillan, P., Oxborough, D., Godfrey, R.J., Smith, G., Maceira, A., Sharma, S., George, K.P., & Whyte, G. (2011). Diverse patterns of myocardial fibrosis in lifelong, veteran endurance athletes. *Journal of Applied Physiology,* 110.

Williams, D., Anderson, E., & Winett, R. (2005). A review of the outcome expectancy construct in physical activity research. *Annals of Behavior Medicine, 29,* 70-79.

World Health Organization (WHO). *Global strategy on diet, physical activity, and health. Strategy document: WHA57.17*. Geneva: WHO, 2004.