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Effect of a 15-Week Wellness Course on Health Indicators and Six Areas of Wellness in College Students

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EFFECT OF A 15-WEEK WELLNESS COURSE ON HEALTH INDICATORS AND SIX AREAS OF WELLNESS IN COLLEGE STUDENTS

by

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Doctor of Education

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DECLARATION OF ORIGINALITY

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Doctor of Education at Lindenwood University by the School of Education.

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Abstract

The current state of health of the United States, including physical inactivity, dietary intake, and overall lifestyle habits is of concern for educators. Specifically, the health of the college population appears to be under-represented in health and wellness research. The purpose of this study was to evaluate a 15-week university wellness-based course on health indicators and six dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual. The researcher hypothesized that students who participated in the wellness-based course (intervention group) would experience positive health outcomes and increased perceptions of wellness in the six areas of wellness.

The intervention group consisted of 66 students (72.4% male). The control group had 58 students (57.6% male). Both groups completed pre-test and post-test health assessments (body mass index, body composition, resting heart rate, blood pressure). The Perceived Wellness Survey (PWS) was used for pre-test and post-test measures for perceived levels of wellness in the six dimensions. During the 15-week semester, the intervention group received wellness education following a curriculum that reviewed all areas of wellness and had an online physical activity tracking component.

Statistical analyses for two of the five health indicators in the intervention group showed significant changes; body mass index ($p<.01$, $t = -2.21$) and resting heart rate ($p<.001$, $t = 3.31$). Perceived wellness scores from pre- to post-test were statistically significant in the intervention group for all six dimensions of wellness ($p<.001$): psychological health ($t = -7.28$),

emotional (t = -4.36), social (t = -3.90), physical (t = -3.38), spiritual (t = -5.56), and intellectual (t = -7.21). Additionally, post-test wellness scores for the intervention group were significantly higher than the control group ($p<.01$, $p<.001$) in all six dimensions of wellness.

The study findings provide strong evidence for the effectiveness of wellness education on the six areas of wellness for college students. The study provides a foundation for future research to evaluate the need for campus wellness initiatives and wellness-based education. In conclusion, university administrators and educators should consider the inclusion of wellness credits into the general education requirements to enhance wellness and encourage a holistic lifestyle that fosters academic success.

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KEY TO ABBREVIATIONS

ACHA	American College Health Association
AOA	American Obesity Association
BMI	Body Mass Index
CDC	Centers of Disease Control
NCHA	National College Health Assessment
NCLB	No Child Left Behind
NHANES	National Health and Nutritional Examination Survey
NIH	National Institutes of Health
SNEWRD	Society for Nutrition Education: Weight Realities Division
USDHHS	United States Department of Health and Human Services
WEL	Wellness Evaluation of Lifestyle
WHO	World Health Organization
YRBS	Youth Risk Behavior Survey

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CHAPTER I - INTRODUCTION

Background of the Problem

The prevalence of obesity continues to increase in adults, adolescents, and children in the United States (Centers for Disease Control and Prevention [CDC], 2007a). In recent years, the World Health Organization reported that an estimated 1.6 billion people are overweight (World Health Organization [WHO], 2006). The main cause of this obesity epidemic is an environment influenced by the western culture that encourages excessive energy intake and discourages physical activity. As noted in a recent study, the requirements for physical education in public and post-secondary education have been decreasing in the United States, and, at the same time, the waistlines of Americans have been expanding (Cawley, Meyerhoefer, & Newhouse, 2006). From 1991 to 2003, the percentage of high-school students enrolled in daily physical education classes in America had dropped significantly from 42% to only 28% (Cawley et al.). Similar data collected from the National College Health Assessment (NCHA) stated that only 32% of college students reported participating in vigorous exercise for 20 minutes or moderate exercise for 30 minutes on 3-5 days/week. Distressingly, the same data indicated a mere 7.6% of those students reported those exercise habits on 6 or more days/week (American College Health Assessment, 2007). As high school students progress from kindergarten through grade 12 (K-12) and continue on to higher education, it seems important to establish structured and un-structured opportunities for young adults to participate in regular physical activity.

As this phenomenon continues, so does the persistent emergence of wellness programs in corporate and educational settings. Wellness programs offer a means of combating this epidemic and providing organizations a healthy environment conducive to increased productivity, physical and mental health and overall well-being. Many national health organizations encourage the school systems, from elementary through to post-secondary, to be advocates of health and mandate physical education and wellness programs (Cawley et al., 2006; CDC, 2006). The CDC stated the public and private school system reaches nearly all American children and has an existing infrastructure that supports physical education and health education (CDC, 2006). The most successful intervention programs involve a support system that includes educators, counselors, nurses, and parents, as well as content such as behavior management, nutrition education, and increased daily physical activity (Pyle, Sharkey, Yetter, Felix, Furlong & Poston, 2006).

Statement of the Problem

Despite the health of the nation, little empirical research exists in the area of physical fitness/health and its relationship to the six dimensions of wellness. The purpose of this study is to build upon existing research and provide a foundation for future research. College students are a population that has been found to be particularly under-represented in wellness research. Lindenwood University has challenged a faculty committee (Wellness Task Force) to institute a campus-wide wellness program, Linden*Well*, for faculty,

staff and students. However, there is a great need to document both efficacy and effectiveness of such wellness initiatives.

The Linden*Well* Program established a new student-centered health clinic designed to meet the health and wellness needs of the University's students. The program has also implemented campus walking route guides, a new website for all wellness information, and new fitness equipment accessible to all students. During a needs-assessment survey completed in the spring of 2008, the Wellness Task Force identified key areas of interest of faculty, staff, and students. The results from this campus survey showed a strong need for walking trails, group fitness classes, and workshops/courses in fitness, nutrition, and stress management.

The intent of this study was to support the implementation of campus wellness programs and the possible general education requirements for universities to include health/wellness credits. Many universities today incorporate health and wellness into the core general education requirements for all students (Brigham Young University, St. Cloud State University, University of Richmond, Earlham College, Southern Methodist University, Binghamton University, Oakland University, Columbia College, Washburn University, North Dakota State University, Minot State University, Eastern Kentucky University, Grossmount College, and others).

Purpose of the Study

The purpose of this study was to evaluate outcomes of a 15-week university wellness-based course on health indicators and six areas of wellness—

physical, psychological, emotional, intellectual, social, and spiritual—in the college population.

Hypotheses

Hypothesis #1. Participants in the intervention group will experience significant health benefits from program participation.

Hypothesis # 2. Participants in the intervention group will report increases in physical wellness.

Hypothesis # 3. Participants in the intervention group will report increases in psychological wellness.

Hypothesis # 4. Participants in the intervention group will report increases in emotional wellness.

Hypothesis # 5. Participants in the intervention group will report increases in intellectual wellness.

Hypothesis # 6. Participants in the intervention group will report increases in social wellness.

Hypothesis # 7. Participants in the intervention group will report increases in spiritual wellness.

Definition of Terms

Wellness-based course. This is an undergraduate course providing physical activity, nutrition, and wellness education that follows the textbook, *Total Fitness and Wellness* by Powers and Dodd (2008). The course follows the regular academic semester and meets for 15 weeks; 3 times per week for approximately 50 minutes per session.

Physical Activity Tracker [STEPS]. This is a 15-week physical activity intervention program using the 10,000 Steps activity log and online resources for a comprehensive physical activity program (www.10000steps.au.org). Participants log daily physical activity by entering total minutes of moderate and/or vigorous activity each week. Participants are able to set physical activity goals and monitor progress throughout the online program.

Perceived Wellness Survey. Perceived Wellness Survey is a tool used to evaluate an individual's perception of personal wellness in the following six dimensions: physical, psychological, emotional, intellectual, social, and spiritual wellness. The survey consists of 36 questions, with six questions related to each area of wellness (Adams, Bezner, Steinhardt, 1997).

Physical wellness. This term refers to all behaviors that keep the body healthy. Key aspects include physical fitness and adequate nutrition to reduce the risk of health-related disease. Performing self-exams, practicing personal safety, and refraining from substance abuse are also important physical health behaviors (Powers & Dodd, 2008).

Psychological wellness. This term refers to a state of psychological well-being in which an individual is able to use his or her cognitive and emotional capabilities, function in society, and meet the ordinary demands of everyday life (Powers & Dodd, 2008).

Emotional wellness. This is also called mental health. It includes social skills, intrapersonal relationships, and levels of self-esteem. The ability to cope

with routine stress of daily living is also an aspect of emotional health (Powers & Dodd, 2008).

Intellectual wellness. This term refers to maintaining an active mind through life-long learning. Intellectual health can increase the ability to define and solve problems, engage in creative thinking, and provide a sense of self-fulfillment (Powers & Dodd, 2008).

Social Wellness. This term is the development and maintenance of meaningful interpersonal relationships; a creation of a support network. Good social health provides confidence in social interactions and provides emotional security (Powers & Dodd, 2008).

Spiritual Wellness. This term refers to the extent to which an individual has a sense of meaning and purpose in life. Spiritual strength may or may not have a religious component. Spirituality may be found through helping others, self-reflection, being altruistic, through prayer, or enjoying the beauty of nature and the divine (Powers & Dodd, 2008).

Summary

As the obesity epidemic continues to threaten the health and productivity of the adult workforce and the future workforce, many are turning to preventative measures as a means to combat this problem. Corporate, community, and educational wellness programs are emerging at astounding rates. In particular, institutions of higher education are acknowledging the need for campus wellness programs for students, faculty, and staff. These campus wellness programs most commonly consist of recreational facilities, mental and

psychological health services, spiritual offerings, and academic credit for wellness courses. There is a need to examine the effectiveness of these programs and services for future planning, implementation, and evaluation of program outcomes. This study will contribute to the research in this field of study and investigate the need for campus wellness services for recreational and academic purposes.

CHAPTER II - REVIEW OF LITERATURE

The review of literature explores the current state of the health of the United States and the role of physical education and wellness programs on college campuses to promote a healthy lifestyle. The research will provide a comprehensive examination of the most recent literature in the field of health and wellness. The literature review aims to support or negate the implementation of wellness-based courses on college campuses for holistic learning and academic success. The literature review provides the foundation for the rationale and purpose of this study.

Overview of Obesity Epidemic

The American obesity epidemic has now become a worldwide health concern as this disease continues to spread globally. Recently, the World Health Organization reported that an estimated 1.6 billion people are classified as overweight and/or obese (WHO, 2006). The main cause of this worldwide obesity epidemic is an environment influenced by the western culture that encourages excessive energy intake and discourages physical activity (Cawley et al., 2006; CDC, 2004). The American way of life, including technological advances and the food industry, has allowed Americans to decrease their physical activity level and increase food consumption of high-calorie, nutrient-deficient foods (American Obesity Association [AOA], 2008).

Classifications for overweight and obesity are defined using body mass index (BMI) by calculating an individual's weight in kilograms divided by height in meters squared. This is the most frequently used measure of obesity and is

used universally to define obesity status for childhood through adulthood. BMI approximates body fat based on the height to weight ratio of an individual. Using BMI, the following classifications have been established: underweight (BMI <18.5), normal weight (BMI 18.5 – 24.9), overweight (BMI 25-29.9), and obese (BMI ≥ 30.0). Additionally, obesity classifications include Obesity Class I (BMI ≥ 30.0 – 34.9), Obesity Class II (BMI 35.0 – 39.9), and Obesity Class III (BMI ≥ 40.0). These classifications serve as an indicator of risks for health-related diseases (WHO, 2006).

Currently, according to BMI measures, an estimated 30% of Americans are obese and 65% are overweight, substantially raising the risk of morbidity from hypertension, type 2 diabetes, coronary heart disease, stroke, and many cancers (AOA, 2008). Higher body weights are also related to increases in all-cause mortality, or death. Obese and overweight individuals may suffer from social stigmatization and discrimination in many areas of life (Society for Nutrition Education: Weight Realities Division [SNEWRD], 2003). According to the National Institutes of Health (NIH), obesity and excess body weight are the second leading cause of preventable death in the United States today, with an estimated 300,000 deaths each year attributed to causes related to obesity (National Institutes of Health, 2007). Furthermore, cardiovascular disease is the leading cause of death for men and women in the United States (CDC, 2007a; NIH, 2007; WHO, 2006). Those individuals with elevated blood pressure, elevated cholesterol levels, and/or elevated blood glucose levels are at increased risk of cardiovascular disease. The likelihood of an individual having one or more

of those conditions is increased for overweight and obese individuals, further increasing the risk of cardiovascular disease. A recent study supported the claims that significant weight gain and obesity contribute to the development of type 2 diabetes, which is now the sixth leading cause of death in the United States (Mokdad, Ford, Bowman, Dietz, Vinicor, Bales & Marks, 2001). The prevalence of those diagnosed with diabetes increased 61% since 1990, which represents an estimated 16.7 million U.S. adults (Mokdad et al., 2001).

Another prevalent health-related disease is known as metabolic syndrome, which is increasing at alarming rates due to inactivity and poor dietary habits. This disease is characterized by the presence of three or more of the following components: (a) central obesity with waist circumference $\geq 90^{th}$ percentile for men and women; (b) elevated triglyceride concentrations; (c) elevated blood pressure with systolic and/or diastolic $\geq 90^{th}$ percentile; and (d) elevated fasting glucose levels. Approximately 22% of U.S. adults manifest the metabolic syndrome according to the above diagnosis criteria from the National Cholesterol Education Program Adult Treatment Panel (ATP) III (Ford, Giles, & Dietz, 2002). Traditionally known as a disease of adults, metabolic syndrome is now being diagnosed in adolescents and children. In 2004, Duncan, Li, and Zhou determined the prevalence of metabolic syndrome in U.S. adolescents from the National Health and Nutritional Examination Survey (NHANES) III data and found the overall incidence of the disease increased from 4% to 6% in 1999-2000. As these health-related diseases continue to threaten American adults, adolescents, and children, researchers continue to examine the

causes of obesity, the consequences of obesity, and the strategies used to effectively combat this epidemic.

Causes of obesity.

There are a variety of factors that contribute to the cause of obesity, including reductions in energy expenditure, increases in energy intake, and increases in consumption of calorie-dense, nutrient-deficient, processed foods (Finkelstein, Rhum, & Kosa, 2005). Without a better understanding of these causes, researchers find it difficult to develop effective strategies to combat obesity. Lakdawalla and Philipson (2002) studied the relationship between reductions in energy expenditure and the technological advances seen in the workplace. They concluded that this relationship may only contribute nominally to obesity because the shift away from manual labor began about 50 years ago, long before the rising obesity rates. It may be possible that the trend towards excess body weight had already begun, however; only in recent years have researchers begun to examine the cause-effect of the obesity epidemic. Additionally, there has been a rapid rise in obesity rates of children and adolescents, who would not be effected by the change in technology in labor and energy-expenditure in the workplace. Due to these phenomena, researchers agree reduction in energy expenditure due to technological advances in the workplace remains a small contributor to this epidemic. However, an overall reduction in energy expenditure outside of the workplace is a topic that warrants review. According to the Surgeon General's Report, many adult Americans are not meeting the recommended daily amount of 30 minutes of moderate physical

activity on most days of the week. Over the last ten years, less than one-third of adults engaged in the recommended amount of activity, and 40% of adults were not involved in any leisure-time physical activity (United States Department of Health and Human Services [USDHHS], 2001).

Research suggests another major contributor to obesity may be the increase in energy intake, which studies agree has increased an estimated 10-15% since the 1980's. Putnum, Allshouse, and Kantor (2002) found that, after remaining relatively constant from 1910 to 1985, caloric intake rose by almost 12% between 1985 and 2000, mainly due to increased consumption of grains, added fats, and added sugars. The CDC indicated that caloric consumption remained stable from 1971-1980 but increased 7.3% for men and 23.3% for women from that point through to 2000 (CDC, 2004). Much of this increase in energy intake was in the form of carbohydrates, specifically simple sugars from soft drinks, fruit juices, and white flour. In 1997, the average American consumed 53 gallons of soft drinks and 17 gallons of fruit juices or other high-calorie drinks, a 51% and 40% increase respectively since 1980 (Putnum et al., 2002). The increase in energy has been attributed to an increase in snacking. While some variations exist in studies about snacking habits, there are many studies that support additional caloric intake as a result of increased snacking. Cutler, Glaeser, and Shapiro (2003) found that higher snack calories were responsible for the whole rise in energy intake among women during the 1970's and 1990's and for 90% of the increase for men.

When evaluating the increase in energy intake, it is important to examine why Americans are consuming more food, particularly processed foods of added saturated fats, added sugars, and hydrogenation of unsaturated fats. Using basic economic principles, the theory of supply and demand can be applied to the food consumption trends over the last 50 years. This theory implies that as a decrease in the price of food occurs, so will an increase in food consumption. This is exactly what researchers found when examining food consumption trends. The Consumer Price Index (CPI) data indicate that food prices rose 3.4% per year from 1980 to 2000, which is actually slower than the 3.8% rise from inflation over the same period, implying a 14% fall in food prices (Economic Planning and Advisory Council, 2004). It is also noted that from 1960 to 1980, before the prevalence of obesity, food prices actually rose slightly faster than the average inflation rate. Most notably of concern, between 1985 and 2000, the price of fresh fish, dairy, fruits and vegetables increased by 118%, 77%, and 56% respectively. In the same study, sugar and sweets, fats and oils, and carbonated beverages increased at lower rates 46%, 35%, and 20% respectively (Putnum et al., 2002).

Along with the changes in food prices of high-quality foods are other economic changes, such as the food industry, technology in the household, and the overall fast-paced life of Americans. The fast food industry has flourished over the last two decades due to the need for quick, on-the-go meals that are of low cost to the consumer. The increased prevalence of marginal cost pricing has contributed to not only the increase in consumption between meals, but the amount of food consumed during each meal (Finkelstein et al., 2005). Portion

sizes at most establishments do not follow the Dietary Guidelines for Americans, but rather promote the *supersize* of meals for a lower price. Nielsen and Popkin (1998) found the largest increase in portion sizes for French fries and sweetened beverages, which are two of the fast food industries most widely consumed products with added sugars and added hydrogenated fats. As this unhealthy way of life for Americans continues, the availability and consumption of fast food, restaurants, and even buffet-style eating for all three meals will continue to increase. Furthermore, some researchers link less frequent home-cooked meals and the seemingly less importance placed on wholesome food and family time to the obesity trends seen in the U.S. (Anderson, Butcher, & Levine, 2003; and Ruhm, 2003).

It would be remiss not to mention the attention television has been given over the years for its potential link to obesity in adults and children by encouraging a sedentary lifestyle. However, there is evidence that the largest growth in television viewing hours occurred during the early 1960's and 1970's, when color first became widely obtainable at reasonably low prices (Finkelstein et al., 2005). Therefore, television alone is most likely not the target culprit of this epidemic, but rather the combination of increased use of televisions, computers, video games, and other media devices. Research currently has only found a link between television viewing and unhealthy dietary habits, such as increased snacking, portion sizes, and the percentage of calories from fat (French, Story, & Jeffery, 2001). While researchers may not have conclusive evidence about technology and the link to obesity, it is well-accepted that the

reductions in energy expenditure, increases in energy intake of the food industry, and overall reduction in physical activity play a role in contributing to the obesity epidemic.

Consequences of obesity.

While examining the cause of health-related diseases is of importance, researchers must look at the effects of these diseases on society. Obesity, diabetes, and metabolic syndrome generate dramatic health care costs that affect the economy (Mokdad et al., 2001). Substantial economic consequences of obesity and excess body weight for the United States health care system include both direct and indirect costs. These health care costs include preventive, diagnostic, and treatment services related to reducing body weight and treating diseases caused by excess body weight. Costs such as physician visits, nursing home care, and hospital stays are included in these direct costs. There have been past studies comparing the annual obesity-attributable medical costs for obese individuals, all having similar findings. In the last 10 years, Thompson, Edelsberg, Kinsey, and Oster (1998) found the total amount of money attributable to obesity accounts for about 5% of health insurance expenditures among businesses with employer-provided health insurance. Other researchers have reported similar percentages for the cost of obesity ranging from 5.5% to 7.0% of annual medical expenditures (Wolf & Colditz, 1998). The cost that taxpayers endure due to obesity medical expenditures is rising. Many obese individuals are covered by Medicaid, and because the Medicaid population has a obesity prevalence higher than 50%, the government funds almost half the total

annual medical costs from obesity (Finkelstein et al., 2005). In 2003, Finkelstein, Fiebelkorn, and Wang showed the average taxpayer spent approximately $175 per year to finance obesity-related medical expenditures among Medicare and Medicaid recipients.

The value of earnings lost by people unable to work due to illness or disability, as well as the worth of future wages lost by untimely death due to excess body weight and obesity, also contributes to the indirect costs. In 2001, the Surgeon General reported the annual national indirect cost of obesity was estimated to be $64 billion with total costs as high as $139 billion per year for direct and indirect costs of obesity. The majority of these costs are associated with type 2 diabetes, coronary heart disease, and hypertension (USDHHS, 2001). States' annual medical spending for prevention, diagnosis, and treatment of individuals with obesity is estimated to range from under 100 million in Wyoming to as much as almost 8 billion in California (CDC, 2007a). Over the past 20 years, the cost related to obesity in children has risen from $35 million to $127 million, with a resulting 228% increase in gallbladder disease and 436% increase in sleep apnea (Zametkin, Zoon, Klein, & Munson, 2004).

A lack of physical activity and unhealthy dietary patterns are not the only health factors that are affecting the overall health and wellness of American adults. Overall lifestyle habits, such as smoking, alcohol use, stress levels, sleep habits, and social factors, such as self-esteem and relationships, have a tremendous impact on the overall well-being of individuals (Cawley et al., 2006; CDC, 2007a; Pyle et al., 2006; USDHHS, 2001). The CDC linked obesity not only

to increased risk for physical illness but also noted the link to a number of emotional, social, and psychological difficulties. Furthermore, persons of all ages with obesity have a higher risk for depressive disorders, distorted body image leading to eating disorders, and low self-esteem (CDC, 2007a). These psychological factors can have a tremendous impact on an individual's ability to be a productive member of society. Research also suggests a relationship between obesity in women of low-socioeconomic status and job opportunities. In one study, the researchers found that obese women had attained less education than non-obese women, even when controlled for educational achievement and income levels of their families of origin (Dietz, 1999). It was suggested this trend may be due to the decreased memory and learning skills attributed to obesity-related ailments as well as the negative stigma attached to obesity (Dietz, 1999).

Unfortunately, these unhealthy conditions are not only affecting adults. There are nearly twice as many overweight children and almost three times as many overweight teenagers as there were in 1980. According to the American Obesity Association (2008), about 15.5% of adolescents (ages 12 to 19) and 15.3% of children (ages 6 to 11) are obese. Type 2 diabetes continues to develop at alarmingly early ages, as do other diseases such as high blood pressure, high cholesterol, and bone and joint problems, as a result of the excess weight in youth (American Diabetes Association, n.d.). While hypertension in youth is still rare, youth with obesity are nine times more likely to have persistently high blood pressure. High blood pressure in youth is one of the strongest predictors of adult high blood pressure, increasing the risk of cardiovascular disease in

adulthood (Dietz, 1999). Another disorder resulting from the incidence of childhood and adolescent obesity is sleep apnea, characterized by brief interruptions during sleep causing learning and memory difficulties, depression, and increased accidents (Barlow & Dietz, 2002).

While physical ailments are a major concern for obese children, there are psychological concerns as well. Parents and educators have described children with obesity as having more emotional and behavioral problems than their classmates and peers. Among adolescents ages 13-14, those with obesity reported more loneliness, sadness, and anxiety than peers of normal weight (Zametkin et al., 2004). At even younger ages, children 9-12 years reported more negative perceptions of their physical appearance and lower self-worth than their peers of average weight (Strauss, 1999). At young ages, children appear to develop prejudices and bias towards their obese classmates and peers. As reported by Dietz (1999), children ages 6-10 years with overweight and obesity are perceived by classmates as less desirable as acquaintances and friends. Middle to elementary age children reported biased perceptions of persons with obesity and attributed undesirable behaviors and habits such as sloppiness and laziness to obese peers (Dietz, 1999).

There are many factors that contribute to this incidence of childhood obesity, many of which are modifiable behaviors: physical inactivity, sedentary behaviors, socioeconomic status, eating habits, environment, and genetics. As the American Obesity Association (2008) noted, children who have overweight or obese parents have a 70% greater risk of being overweight or obese as a child,

continuing into adulthood. Parents and parent guardians play an integral role in the values and belief systems of their children, including the role of physical activity, dietary intake, and overall importance of health. As a child's primary caretaker, a parent or parent guardian predominantly provides the sources of dietary intake available to the child and the opportunities to participate in structured and unstructured physical activity. In a recent study, Bosaldua and Chiquete (2008) reiterated the impact of genes and family environment and lifestyle on the effects of obesity into adulthood. However, it is agreed by most researchers that the percentage that can be attributed to genetics appears to be very small, compared to the percentage that can be attributed to the family, school, and social environment (Hebebrand, Sommerlad, Geller, Görg, & Hinney, 2001).

As this epidemic continues in youth, much attention is given to the patterns of obesity from childhood to adulthood. Studies support that those children who live a lifestyle characterized by inactivity and a poor diet are more likely to continue this lifestyle into adulthood. Specifically in 2002, a study argued that many of the risky lifestyle practices that begin in childhood and adolescence, such as smoking, alcohol use, poor dietary habits, and a sedentary lifestyle, are the same behavior risk factors that continue through to adulthood (Barlow & Dietz, 2002). Additionally, these risk factors are the same factors that predispose these adults to premature death through increased risk of coronary heart disease, type 2 diabetes, cancer, pulmonary disease, and stroke (Pyle et al., 2006). In 1996, the USDHHS estimated that half of youth and young adults ages

12-21 years are physically inactive, with participation in any form of physical activity decreasing with age. The lack of physical activity in youth and young adulthood is not the only component of wellness that warrants concern. The CDC reported rates of adolescent health risk-taking behavior and lifestyle habits to be of concern in the United States. In 2004, the CDC's report stated that one in four high school students use tobacco, two-thirds of all death among youth is a result of injury-related causes, and teen sexual activity leads to over 800,000 unplanned pregnancies and roughly 3 million cases of sexually transmitted diseases each year. As evidenced in literature, the physical, mental, and social health status of youth is undoubtedly alarming and raises many concerns for the direction of future health promotion and nation-wide education.

The Role of Physical Education

Physical activity in K-12.

Many health professionals are evaluating the how and why to the current obesity epidemic. While there are numerous factors that may contribute to the epidemic, many professionals are turning to schools for answers due to the influence the school environment has on the development of students. As noted in a recent study, the requirements for physical education in the schools has been decreasing all over the nation at the same time the waistlines of America's youth has been expanding (Cawley et al., 2006). From 1991 to 2003, the percentage of high-school students enrolled in daily physical education classes in America has dropped significantly from 42% to only 28% (Cawley et al., 2006).

Distressingly, the same trend is being seen at the middle school and elementary levels partly due to the reduction in physical education requirements and partly due to the reduction in recess for elementary students. Recently, the U.S. Department of Education reported that 14-18% of U.S. children in grades 1-6 get 15 minutes or less of recess per day (National Center for Educational Statistics, 2007). Additionally, forty percent of schools have reported eliminating some recess time in order to concentrate on academics in the core subjects: mathematics, communication arts, social studies, and science (Clements, 2000). The benefit of regular recess for children is well-documented in research and supports the notion that growing, active minds need time to play, interact, and create outside of the traditional classroom while socializing with peers. Children who are very active and kinesthetic in nature seem to struggle academically when deprived of recess; these same students often suffer from attention disorders, further supporting the importance of recess (Silver, 2005). Unfortunately, many educators have used recess as a tool for disciplinary action, and these same children who struggle with attention disorders may be more likely to lose recess privileges due to disruptive behavior, further provoking behavior problems during regular classroom time (Santa, 2007). The National Association for Sport and Physical Education cautions schools from allowing children to be inactive for longer than 2 hours at a time to maximize active engagement and cognitive functioning (Council on Physical Education for Children, 2001). Furthermore, the opportunity for children to practice social interaction with peers contributes to successful problem-solving skills and

prepares them for future negotiations as an adult. However, arguably the most important reason to allow students to have regular recess is for the physical activity. The Surgeon General recommends children over the age of two years get 60 minutes of moderate to vigorous exercise on most days of the week (USDHHS, 2001).

In 2006, the CDC conducted the national School Health Policies and Programs Study (SHPPS) to assess school health policies and practices at the state, district, school, and classroom levels. According to their findings, less than 4% of elementary schools, less than 8% of middle schools, and a mere 2% of high schools provided daily physical education or its equivalent (defined as 150 minutes per week in elementary schools and 225 minutes per week in middle schools and high schools) for the whole school year (36 weeks) for students in all grade levels in the school (CDC, 2006). While the amount of physical education in schools is declining, studies are also showing the amount of actual physical activity received in a 60 minute physical education class has also declined. One study showed that elementary school students received only 3 minutes and 24 seconds of physical activity per 40-minute physical education class. Another concern is that although physical education class will increase physical activity during class however, students may decide to be less active at other times during the school week (Cawley et al., 2006). Therefore, the actual structure and curriculum design of physical education class is a topic of much interest to health educators.

The decline in physical education classes is not the only factor that has contributed to excess weight seen in adolescents and young adults. The consumption of high-calorie soft drinks and high-fat foods in schools' cafeterias has also played a key role. The SHPPS also collects data on nutritional programs and services provided in the public school systems. In 2006, 32.7% of elementary schools, 71.3% of middle schools, and almost 90% of high schools had a vending machine, snack cart, or school store where students could buy foods and drinks (CDC, 2006). While these statistics do not guarantee students were purchasing these selections, the study found that only 4.0% of states and 6.6% of districts required that offer fruits and vegetables to students whenever food was sold. Therefore, the probability that healthy, nutrient-dense, low-calorie foods are available in these school stores or snack bars is highly unlikely. When considering why schools allow soft drinks and vending machines in their buildings, consumers must remember that at the heart of every public school is a limited budget that is searching for ways to expand. This can even be seen in the administrative decisions made regardless of health indicators to the students. In 2006, the majority of districts received a specified percentage of soft drink sales , and 32.5% received incentives such as donations or cash rewards (CDC, 2006).

With the alarming numbers about the health status of youth in America, it may seem shocking to see the shift and reduction in physical education. However, state mandated testing and laws such as No Child Left Behind (NCLB) are questioning administrators' decisions to keep academic electives, such as fine arts, family consumer sciences, and physical education courses. The

accountability that teachers, administrators, and states feel to improve student achievement has resulted in decision making that has drastic consequences on the priority and implementation of physical education in schools. Furthermore, as state mandated testing continues, the importance of physical and mental readiness to learn must be taken into consideration in order for students to be able to learn at their full potential through optimal health. In 2004, the nonprofit organization Action for Healthy Kids released a special report identifying the link among the factors of poor nutrition, inactivity, and academic achievement. They discussed the research that supports the benefits of physical activity and proper nutrition on the ability of students to perform academically. Brown & Pollitt (1996) found that children who suffer from poor diets during the brain's most developmental years score much lower on tests of reading comprehension, vocabulary, arithmetic, and general content knowledge, all of which are a focus of the current standardized tests in elementary schools.

After an evaluation of the current research, the National Association for Sport and Physical Education and the Council of Physical Education for Children (2001) concluded that students who participate in daily physical education exhibit improved concentration, a more positive attitude toward their education, and better academic performance. The California Department of Education analyzed results of physical fitness testing in 2001 and compared them with the SAT-9 and found that higher academic achievement correlated strongly with higher levels of fitness at fifth, seventh, and ninth grades. Even at the grade school level, research supports the benefits of proper nutrition, adequate

physical activity, and academic success. A 2001 study concluded that 6 to 11 year olds from families with limited food sources had significantly lower math scores and were more likely to replicate a grade level (Alaimo, Olson, & Frongillo, 2001). When children do not have breakfast it has shown to adversely affect student achievement on creative and problem-solving tests, such as the state mandated tests under NCLB (Pollitt, Leibel, & Greenfield, 1991). In order to encourage schools to have physical education as part of each grade level's curriculum, the President's Council on Physical Fitness and Sports (1999) made this statement:

> Evidence suggests that time spent in physical education DOES NOT decrease learning in other subjects. Youth who spend less time in other subjects to allow for regular physical education have been shown to do equally well or better in academic classes. (¶ 19)

Even though research is in support of physical education and proper nutrition in schools, this does not appear to be a common practice as America moves forward in public education. As public and private educators become more accountable for student achievement in the core subject areas, the relationship between student achievement and healthy active minds remains a topic of interest.

Many national health organizations encourage the school systems to be advocates of health. The CDC (2007b) stated the public and private school system reaches nearly all American children and has an existing infrastructure that supports physical education and health education. The majority of medical, public health, and education organizations, including the American Academy of

Pediatrics, President's Council on Physical Fitness and Sports, Department of Health and Human Services, Department of Education, and National Association of State Boards of Education, have called for legislation to increase the amount of physical education in schools (Cawley et al., 2006). In 2005, forty-four states introduced legislative bills to increase or reform school physical education due to the concerns of rising health-related diseases (Cawley et al., 2006).

There are currently state mandated laws for physical education; however, how each district and school implements those laws may be very different. The 2001 Shape of the Nation Report surveyed all states in order to document the state mandates and the availability of physical education programs at each school level in every state. Cawley et al. (2006) took this data and standardized the data so that one unit of physical education had the same meaning across states. The researchers concluded the amount of physical education required by state varied from 0 (no requirement) to 4 years in half-year increments. Thus, there is still a large difference among school systems on the implementation and prioritization of physical education. For students in high school (grades 9-12) the 2007 National Youth Risk Behavior Survey (YRBS) reported 53.6%, just over half, of students reported attending physical education classes on one or more days on an average week when they were in school (CDC, 2007b). Alarmingly, that reflects an unfortunate 46.4% of students participating in less than one day of required physical education classes during a school week (CDC, 2007b).

Physical activity in college.

The decreasing trend in physical education is also being seen in post-secondary education. While state requirements are only mandated in the public K-12 educational system, some universities have physical education courses as part of the general education requirements for completion of a bachelor's degree. However, as the overweight and obesity rates in young adults ages 18-25 continue to increase, educators are urged to evaluate the physical activity habits of students during the transition years from high school to a college campus. Along with the data that only half of high school students are receiving physical education classes, the 2007 YRBS also showed that no more than 34.7% of those same students met recommended levels of physical activity (i.e., they were physically active doing any kind of physical activity for at least 60 minutes per day on five or more days per week) (CDC, 2007b). Similar data collected from the National College Health Assessment (NCHA) stated only 32% of college students reported participating in vigorous exercise for 20 minutes or moderate exercise for 60 minutes on three to five days/week. The same study reported a mere 7.6% of those students reported those exercise habits on six or more days (NCHA, 2007). As high school students graduate from the K-12 educational system and continue on to higher education, it is important to establish structured and un-structured opportunities for these young adults to participate in regular physical activity.

The transition from high school to post-secondary education is characterized by considerable change, including academic and personal

freedoms, social environments, responsibilities, and overall lifestyle behaviors. During the transition, habits and daily routines that were established within a somewhat structured environment of high school and home are disrupted. The disruption of these patterns, along with the added dimension of living away from home for the first time, often results in ambiguity and loss of reference points and structure in the new environment (Bray & Born, 2004). There is limited research to evaluate the physical activity habits during this transition period from high school to college, but overall, research shows a decline in physical activity habits for first year freshmen (Bray & Born, 2004). Leighton and Swerissen examined the relationship of distal factors (past use of physical activity facilities in high school) and proximal factors (support of friends) to physical activity levels of first-year college students (1995). One third of the students reported they had increased their level of activity during the first year of post-secondary education, whereas 25% had maintained the same level of physical activity they had in high school. The remaining 42% of students reported engaging in lower levels of physical activity than they had during their last year of high school (Leighton & Swerissen, 1995).

In a more recent study, researchers evaluated vigorous physical activity patterns (three or more bouts of physical activity lasting for 20 minutes or longer) and found 66.2% of students reported being vigorously active during the last two months of high school, but only 44.1% of students reported being active during the first two months of college (Bray & Born, 2004). Due to the relationship between overall physical health and psychological well-being, Bray

and Born included a psychological tool during their research to examine the psychological factors that are affected by physical activity behaviors. They found those students who were active reported more positive mood profiles in the forms of lower levels of tension and fatigue and higher levels of vigor compared with those who were insufficiently active. The psychological findings of the study are consistent with research that supports that regular exercise improves not only physical health indicators, but also mental health indicators, such as mood, concentration, self-esteem, and overall stress levels (Cawley et al., 2006; CDC, 2007a; Dietz, 1999; Strauss, 1999; Zametkin et al., 2004).

As stated earlier, many adult health behaviors and lifestyle norms are established during late adolescence and early adulthood, so the decline in physical activity during the transitional period from high school to college is a trend that deserves much attention (Calfas, 2000). Unfortunately, research is lacking in evaluating the physical activity patterns of all undergraduate students and is virtually non-existent in the graduate student population. In a recent meta-analysis of college students' physical activity patterns, it was stated this lack of research may be due partly to the low retention rate of graduate students or the convenience of the large undergraduate population at most colleges and universities (Keating, Guan, Pinero, & Bridges, 2005). Nevertheless, there are some studies that evaluate physical activity and sedentary lifestyle patterns in the college population, and often these studies compare results to the National College Health Risk Behavior Survey results about physical activity. The majority of literature available agreed with this survey and stated that

about half of college students engage in the recommended 30 minutes of moderate activity or 20 minutes of vigorous activity on at least three to five days per week. Interestingly, college students tend to have different exercise preferences than the general population. College students reported they are likely to continue participating in physical activities that they already feel competent performing, for example, running, group fitness classes, and exercises using cardiovascular equipment, as opposed to the general population that reports walking as a popular form of physical activity (Keating et al., 2005).

Due to the demands of academic course work, some researchers believe physical activity habits may be developed partially as a result of study habits and school-related computer use of the college student. A concept known as *behavioral economics* provides a model for studying the decision to choose sedentary or active behaviors (Epstein & Roemmich, 2001). This concept states that individuals base their decisions to engage in a particular activity on access (i.e., the work needed to obtain the activity) and motivation (i.e., the reinforcing value of the activity). In 2004, Buckworth and Nigg stated this could apply to college students because they have specific time constraints related to their academic schedules, but they also have considerable discretionary time. The choices students make about how to spend this time influences their level of physical activity. For example, the reinforcing value and subsequent participation in studying and school-related computer use may increase for college students as they near graduation, whereas organized exercise may take more effort, and, therefore, participation may decrease.

When researching physical activity, exercise, and sedentary behavior in undergraduates enrolled in activity classes, findings from Buckworth and Nigg (2004) reported students spent almost 30 hours in a typical week engaged in sedentary behaviors, specifically studying, supporting the above stated notion. In addition, researchers found significant differences between men and women on variables indicating sedentary behaviors and physical activity. The male students reported more hours per week spent watching television and/or videos and using the computer compared with the female students. Despite that finding, men self-reported higher levels of exercise compared with women (Buckworth & Nigg, 2004).

Theory of Health Behavior Change

When considering physical activity habits and other mental, social, and wellness health behaviors, researchers often examine the etiology of individual's decisions to engage or not engage in particular health behaviors. In order for health promotion programs to have optimal success, they must have a behavior modification component that guides the foundation of the program. *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity* (USDHHS, 2001), established key actions for successful behavior change organized in a framework called CARE: Communication, Action, Research and Evaluation. Within the CARE framework, effective actions must occur at multiple levels to achieve successful behavior changes. The report states successful efforts must focus not only on an individual's behavior change, however, but also on group, institutional, and community influences, as well as

public policy. Furthermore, the report reiterates that individual-focused behavior change may fail due to the lack of consideration of social, cultural, economic, and environmental influence (USDHHS, 2001). Therefore, health promotion programs should focus on community populations and intervention strategies to improve an individual's health and well-being and decrease the risk of health-related diseases.

In regards to health behaviors, there are two overwhelmingly accepted theories that are mainstream in health promotion: Health Belief Model and Stages of Change. Both of these models provide a foundation for change for a variety of health behaviors and help professionals guide individuals through adapting healthy behaviors into a daily routine and permanent lifestyle. The Health Belief Model and the transtheoretical model, known as the Stages of Change, must guide intervention strategies in order to promote successful behavior change of individuals and community populations in youth and adults.

Health Belief Model.

The Health Belief Model, originally postulated by Bandura (1977), is a health behavior change theory built upon the foundational concept of self-efficacy theory that attempts to predict health-related behavior in terms of certain belief patterns. Self-efficacy theory is often viewed as one approach to the more general study of the applicability of social learning or social cognitive theory, based on the idea that individuals are motivated to learn a particular behavior simply by observing it in others in their surroundings (NIH, 2003). As well as being used to explain motivation for change, self-efficacy theory assumes

that individuals possess a personal belief system, referred to as self-efficacy, which gives them a level of control over personal thoughts, motivations, feelings, and actions. Factors contributing to self-efficacy include past experience, modeling, verbal persuasion, physiological state, and emotional state. In theory, if an individual has high self-efficacy or belief in the ability to make a change, he/she will be more likely to make a health behavior change and maintain that change over time. Processes that promote the acceptance of health-promoting behaviors include adoption of new individual change, generalized use under conflicting circumstances, and adoption and maintenance of the behavior over time (NIH, 2003).

The Health Belief Model was theorized as a result of Bandura's further examination of self-efficacy as it relates to health behavior change. This exploration was partly driven by social psychologists in the United States Public Health Service to explain the lack of public participation in health screenings and community prevention programs. The Health Belief Model became a psychological model that placed emphasis on an individual's perception and beliefs about the effects of changing a health behavior (NIH, 2003). The model uses the following categories: perceived susceptibility (subjective perceptions of the risk of contracting a health condition), perceived severity (feelings concerning the seriousness of contracting an illness), perceived benefits (believed effectiveness of strategies designed to reduce illness), perceived barriers (potential negative consequences that may result from taking action), cues to action (motivation to take action), and lastly, self-efficacy (belief in the ability to

accomplish change). The aforementioned categories of the Health Belief Model and the application of its use by health professionals are presented in Figure 1.

Concept	Definition	Application
Perceived Susceptibility	One's opinion of chances of getting a condition	Define population(s) at risk, risk levels. Personalize risk based on a person's features or behavior. Heighten perceived susceptibility if too low
Perceived Severity	One's opinion of how serious a condition and its conditions are	Specify consequences of the risk and the condition
Perceived Benefits	One's opinion of the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take: how, where, when; clarify the positive effects to be expected
Perceived Barriers	One's opinion of the tangible and psychological costs of the advised action	Identify and reduce barriers through reassurance, incentives, assistance
Cues to Action	Strategies to activate 'readiness'	Provide how-to information, promote awareness, reminders
Self-Efficacy	Confidence in one's ability to take action	Provide training, guidance in performing action

Figure 1. Health Belief Model Overview.

From *Theory at a Glance: A Guide for Health Promotion Practice* (2nd ed.), by National Institutes of Health, 2003.

It is postulated that health-seeking behaviors are mediated by a person's level of perceived susceptibility and perceived severity. Furthermore, the extent to which the perceived benefits have a high protective barrier against disease is a strong indicator for behavior change (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004).

Research supports the use of the Health Belief Model for health professionals to assess an individual's readiness to make a negative behavior into a positive health behavior (NIH, 2003). If an individual has low perceived susceptibility, he or she does not perceive a susceptibility to the health-related diseases associated with the negative health behavior in which the individual is

engaging. For example, if sedentary individuals do not perceive that they are susceptible to cardiovascular disease, they are unlikely to begin an exercise program. Likewise, if an individual has low perceived severity, he or she does not perceive the health-related disease that may arise due to a negative behavior as a serious condition that warrants concern. Therefore, the same individual may not begin an exercise program because he or she does not perceive that cardiovascular disease is a serious condition. The role of the health profession is to provide resources and consultations that help an individual increase perceptions that a health-related disease is indeed a possible outcome of the negative health behavior with severe consequences. Figure 2 illustrates the factors involved in the Health Belief Model and possible variables involved in the model that promote a cue to action for behavior change.

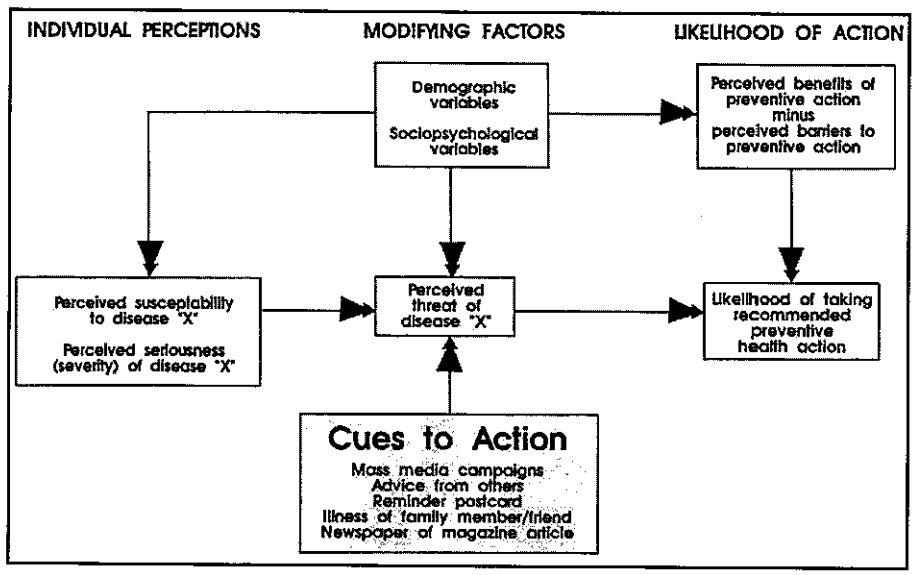

Figure 2. Health Belief Model Flow Chart for Behavior Change

From BDJ VOLUME 186, NO. 9, MAY 8 1999. Marketing dental care to the reluctant patient. Basic elements of the health belief model

In the Health Belief Model, Bandura (1977) examined the social cognitive theory and its relationship to health behavior change. As a result of his research, Bandura supported the use of cognitive constructs for successful behavior change, such as knowledge of benefits and barriers of a particular behavior and self-efficacy regarding one's ability to change a behavior. Based on this well-accepted theory, there is a need to determine the role that cognitive constructs play in the development and maintenance of a lifestyle approach to health behavior (Gieck & Olsen, 2007).

Stages of Change – transtheoretical model.

In addition to the Health Belief Model, research over time has supported the transtheoretical model, also known as the Stages of Change, as a theory to explain health behavior change. This model initially was studied in relationship to alcohol and smoking habits; however, in recent years researchers have applied this theory to other health behaviors including exercise and dietary habits (Armitage, Sheeran, Mark, & Madelynne, 2004; Sarkin, Johnson, Prochaska, & Prochaska, 2001). The Stages of Change model depicts five stages of change that most individuals go through when making a behavior change. The stages consist of Stage 1: pre-contemplation (not intending to make a change); Stage 2: contemplation (intending to take action in the next 6 months); Stage 3: preparation or determination (intending to take action in the next month); Stage 4: action (engaging in a new behavior [may be up to 5 years]); and Stage 6: maintenance or adoption (sustaining the new behavioral change over time) (Horneffer-Ginter, 2008).

Correspondingly, how an individual moves from one stage to the next is dependent upon perceived variables of the Health Belief Model and the individual's level of self-efficacy. Therefore, motivation to change health behaviors only occurs when an individual has moved through the contemplation stage and into preparation for action. Research states that for most risk behaviors such as physical inactivity, smoking, alcohol use, and poor dietary intake, forty percent of people are in pre-contemplation and forty percent are in contemplation (Prochaska, 2000). In order for an individual to move from pre-contemplation through to preparation there must be an increase in perceived benefits of the behavior change and a decrease in the perceived barriers to change.

There are particular cognitive and emotional processes that an individual may go through in order to prompt an increase in perceived benefits and a decrease in perceived barriers. Prochaska has outlined these processes in her research about the Stages of Change Model and the movement through each stage (2000). The cognitive thought processes involved include consciousness raising (increasing awareness), dramatic relief (emotional alertness about one's current behavior and relief that can come from changing), and environmental re-evaluation (considering the impact of one's current behavior on one's social environment). The above three practical processes are key in moving from the pre-contemplation to the contemplation stage. Following contemplation is the preparation stage, where Prochaska reiterates the importance of self-reevaluation (values clarification and imagining one's self after change). To then

move into action, the goal of all health promotion programs, self-liberation must be present. Self-liberation is similar to Bandura's concept of self-efficacy theory, an individual's belief in the ability to make a change (Prochaska).

Horneffer-Ginter (2008) evaluated six key health behaviors in the college population and the student's subsequent reported stage of change for changing that particular behavior. She found a high percentage of respondents reported being in the pre-contemplative stage for the consumption of alcohol and dietary patterns. In contrast, fifty percent of students reported being in the maintenance stage for managing acute stress. However, students reported being in the preparation stage for exercise. The researcher also evaluated the relationship among stages of change for various college social behaviors and found tobacco use was positively related to alcohol consumption, managing depression, and even managing stress. Additionally, there was a positive significant relationship between diet and exercise in the sampled college population. In applying these results to the implementation of health promotion programs on college campuses, the researcher concluded healthy eating, alcohol consumption, and managing depression should be discussed at the pre-contemplation stage (using Prochaska's recommended process of consciousness raising, dramatic relief, and environmental reevaluation). Tobacco use should be addressed at the contemplation stage and interventions to encourage exercise and regular physical activity should be equally matched to the contemplation and preparation stages (using self-reevaluation and self-liberation), and

interventions for managing stress should be offered across the three stages (Horneffer-Ginter, 2008).

An important component of the Stages of Change model, characterized by an event that causes the individual to move backwards in the model, is known as relapse. As it is important to identify how to move an individual through the stages of change towards adoption of a new behavior, it is also important to identify factors that may lead to a relapse, therefore, causing the individual to move backwards in progress. Figure 3 represents the Stages of Change from pre-contemplation through to maintenance of a new behavior, while illustrating the negative movement of relapse back to pre-contemplation of change.

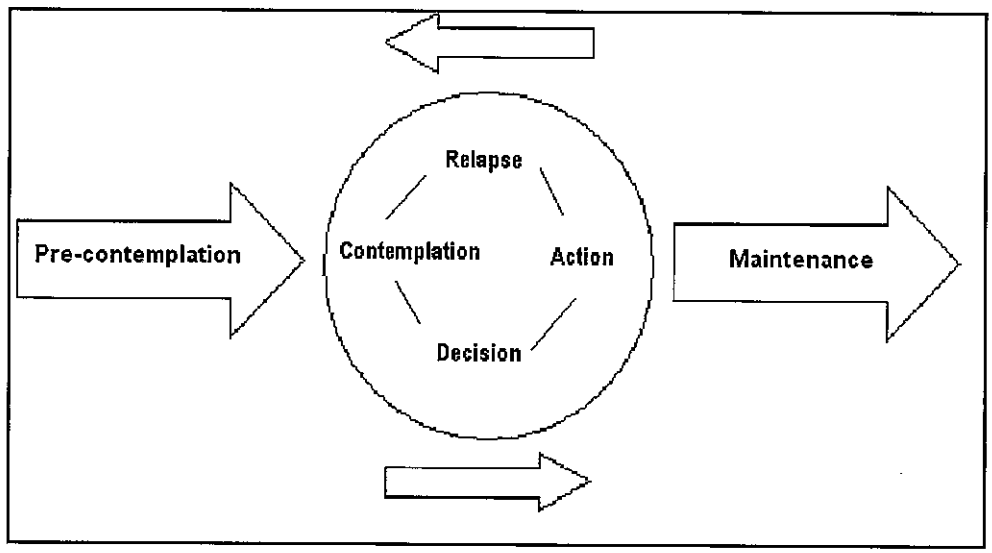

Figure 3. Stages of Change

From "Change at Differing Stages," by J. Prochaska, 2000, in C.R. Snyder & R.E. Ingram, *Handbook of Psychological Change: Psychotherapy Processes and Practices for the 21st Century* New York: John Wiley & Sons.

In order to prevent relapse, behavior modification strategies can be suggested and implemented by a health professional when helping an individual make a

lifestyle change. Popular behavior modification strategies include behavior change contracts, self-monitoring, counter conditioning, self-reinforcement, decisional balancing, and short and long term goal setting (Powers & Dodd, 2008).

Sullum, Clark, and King (2000) studied predictors of exercise relapse in the college population; specifically the researchers examined decisional balancing and self-efficacy. Decisional balancing involves weighing the pros and cons of engaging in a particular behavior. In the study by Sullum et al. (2000) the behavior was exercise. Researchers found that after a three month period, in terms of decisional balance, those subjects that reported more cons, or barriers, at baseline were predictive of exercise relapse. In addition, relapsers' rating of the pros, or benefits, for exercise decreased over time, whereas pros did not change for maintainers. Self-efficacy was also a predictor of exercise relapse with those students with higher self-efficacy scores at baseline being less likely to relapse.

The findings support the application of the transtheoretical model, or Stages of Change, and self-efficacy in the college population. Furthermore, the researchers note that the con statements were the aspect of decisional balance that differed at baseline, whereas the pro statements were the aspect that changed. Applying this concept to practice supports that health educators should develop programs that initially focus on reducing the cons of exercise and then shift focus and highlight the pros associated with regular exercise, therefore reducing the risk of relapse and increasing adherence to the program (Sullum et

al., 2000). Overall, researchers have found that offering health intervention programs that are matched to a person's current stage of change is more effective than implementing a traditional action-oriented health initiative (Prochaska, 2000). This statement is true not only for individuals, but also for health promotion for populations (Horneffer-Ginter, 2008). Therefore, assessing different individuals and community populations' readiness to change is an important factor for health professionals to consider as programs are designed and implemented in a variety of settings.

Physical Activity and Wellness on College Campuses

Health promotion.

Physical education and wellness activities promote creativity, communication, social involvement, and holistic student development for all students. From kindergarten to high school years and into higher education, health promotion programs are being implemented to combat the obesity epidemic and help youth and young adults establish a lifestyle that promotes personal responsibility for an active lifestyle and overall well-being. Furthermore, student learning is the core academic mission of higher education, and health promotion serves this mission by supporting students and creating healthy learning environments (American College Health Association [ACHA], 2004).

The most well-known initiative in health promotion for the college population is guided by Healthy Campus 2010, a government-funded initiative led by the NIH and CDC that builds upon the existing Healthy People 2010

initiative pursued over the preceding two decades (CDC, 2007a; NIH 2007; USDHHS, 2000). Healthy People 2010 is a set of health objectives for the nation to achieve over the first decade of the new century. Specifically, the USDHHS (2000) stated the following:

> Healthy People 2010 builds on initiatives pursued over the past two decades. The 1979 Surgeon General's Report, Healthy People, and Healthy People 2000: National Health Promotion and Disease Prevention Objectives both established national health objectives and served as the basis for the development of State and community plans. Like its predecessors, Healthy People 2010 was developed through a broad consultation process, built on the best scientific knowledge and designed to measure programs over time. (p. 1)

The two overarching goals of Healthy People 2010 are to increase quality and years of healthy life and to eliminate health disparities across segments of the population in the United States. There are 28 focus areas in all created by scientists both inside and outside of government to identify a wide range of public health priorities and specific, measurable objectives (USDHHS, 2000).

Specific to the young adult population, Healthy Campus 2010 in collaboration with the American College Health Association (ACHA) establishes national college health objectives and serves as a basis for developing plans to improve student health. The Leading Health Indicators reflect the major public health concerns in the United States and were chosen based on their ability to motivate action, the availability of data to measure their progress, and their

relevance as broad public health issues (ACHA, 2007). According to the USDHHS (2000) the Leading Health Indicators are

> (a) Physical Activity, (b) Overweight and Obesity, (c) Tobacco Use, (d) Substance Abuse, (e) Responsible Sexual Behavior, (f) Mental Health, (g) Injury and Violence, (h) Environmental Quality, (i) Immunization, and (j) Access to Health Care (p. 1).

These health indicators represent an umbrella of health concerns for the college population and provide focus for health professionals and health promotion programs.

As the first two indicators of Healthy Campus 2010 are physical activity and overweight/obesity, these two indicators are areas of focus that shape the design and implementation of health promotion on college campuses. In addition, health professionals can use the ACHA's recently established *Standards of Practice for Health Promotion in Higher Education* developed to advance the health of students and to contribute to the creation of healthy and socially strong campus communities (ACHA, 2004). The *Standards* also provide a set of measurable indicators to evaluate comprehensive health promotion programs and guide the recognition and expansion of those programs (ACHA, 2004).

Standards of Practice for Health Promotion in Higher Education.

The effective practice of health promotion in higher education requires professionals to maintain six standards. Standard 1 is *Integration with the Learning Mission of Higher Education*: Incorporate individual and community health promotion initiatives into the learning mission of higher education.

Standard 2 is *Collaborative Practice*: Support campus and community partnerships to advance health promotion initiatives. Standard 3 is *Cultural Competence*: Demonstrate cultural competency and inclusiveness in advancing the health of individuals and communities. Standard 4 is *Theory-based Practice*: Understand and apply professionally recognized and tested theoretical approaches that address individual and community health. Standard 5 is *Evidence-Based Practice*: Understand and apply evidence-based approaches to health promotion. Standard 6 is *Continuing Professional Development and Service*: Engage in on-going professional development and service to the field. These Standards of Practice provide measureable guidelines for enhancing the quality of health promotion programs in colleges and universities. For the individual professional, the Standards of Practice are designed to guide daily efforts, assess individual skills and capacities, and assist in decisions to improve practice through professional development (ACHA, 2004, p. 4-6).

Allowing Healthy Campus 2010, the Standards of Practice, and the theories of health behavior change to guide the development of health promotion programs on college campuses is a notion supported and backed by sound research (ACHA, 2004; Bandura, 1977; CDC, 2007a; NIH, 2007; Prochaska, 2000). In the latest research, Horneffer-Ginter (2008) stated promoting healthy lifestyle behaviors in college students is essential and demanding work, especially because health habits formed during young adulthood often set the foundation for the behaviors and attitudes carried into later life. Consequently, increasing physical activity habits and improving eating habits in this

population may have a substantial impact on the health and productivity of a future workforce. In a landmark study, guided by Paffenbarger, of 16,936 college alumni, researchers showed decreased rates of mortality of up to 49% in participants who maintained regular physical activity from the college years to age 70 to 84 years (Paffenbarger, Hyde, Wing, & Hsieh, 1986). Additionally, the college years are a formative developmental period when health habits may be more easily shaped than in older adulthood (Horneffer-Ginter, 2008).

Given that college campuses serve young adults for undergraduate and graduate studies, these campuses provide a unique and practical setting for health promotion programs (Clemens, Engler, & Chinn, 2004). When implementing health promotion programs, there are two questions that arise in the literature: (a) how to most effectively promote and support an initiative, and (b) how to motivate the students to participate in such programs. While addressing the first issue may be a matter of administrative support and available resources, much attention should be given to the motivation of students to participate in programs.

Specific to physical activity and exercise, researchers agree it is important to evaluate the perceived barriers and perceived benefits in the college population as a means to design and implement effective health promotion programs that motivate change. According to Healthy People 2010 and Healthy Campus 2010, the major barriers most individuals, including students, face when trying to increase physical activity are available time, access to convenient facilities, and safe environments in which to be active (ACHA, 2007).

Additionally, it is important to examine the perceived benefits of exercise in the college population because they are most likely different than the general population due to the unique lifestyle of a traditional college student. One study examined why college students reported being physically active and reported a significant number of students stated physical performance, appearance, and personal accomplishment were the main benefits that motivated them to engage in exercise (Grubbs & Carter, 2002). These findings support the view that the college population, both male and females, exercise merely for physical performance benefits and physical appearance, as opposed to health benefits from regular exercise. On the contrary, the middle-aged population reported engaging in regular exercise to prevent chronic disease, to manage weight and stress, and for personal enjoyment (Grubbs & Carter, 2002).

Most research in the college population, while limited, evaluated motivational factors to adherence to voluntary or recreational exercise programs. However, the literature does not evaluate the motives for participation in organized athletic teams. Many college campuses offer the opportunity to participate in recreational physical activities as well as structured athletic teams, both of which promote daily physical activity. Therefore, identifying why students are motivated to participate in either or both programs may help guide how to market these programs to students, thereby increasing the likelihood of regular engagement in physical activities and sports. In 2005, researchers examined why students, both men and women, were motivated to participate in sport or recreational exercise and found the motivational factors to be very

different (Kilpatrick, Hebert, & Bartholomew, 2005). The highest rated motives for sport participation were competition, affiliation, enjoyment, and challenge. Conversely, the highest rated motives for participation in exercise were health-related and appearance-related, while most heavily weighted on appearance-related motives. These study findings indicate that participation in sport is more strongly linked to intrinsic motives, whereas exercise is associated with mainly extrinsic motives (Kilpatrick et al., 2005). The researchers also noted gender differences for motivation for sport participation and exercise, where men reported being highly motivated by performance factors, such as strength and endurance, challenge, competition, and public recognition. Identifying gender differences in motivation to participate in exercise and/or organized sport activities will also help tailor health promotion programs to be gender-specific, therefore, increasing the likelihood of compliance.

Wellness initiatives.

Many health promotion programs are created to increase physical activity for college students; however, little attention has been given to other areas of wellness, such as psychological, emotional, intellectual, social, and spiritual health. Researchers and college students seem to agree that wellness is defined by more than just physical elements, such as fitness level and dietary intake; however, research is limited in this particular population (Hermon & Hazler, 1999; Sivik, Butts, Moore & Hyde, 1992; Witmer & Sweeney, 1992). Historically, researchers have focused on physiological trends in the college population, examining physical activity patterns, exercise adherence, and the health-related

outcomes of these two variables (Bray & Born, 2004; Keating et al., 2005; Paffenbarger et al., 1986. Despite this fact, there has been a growing emergence of holistic campus wellness programs in post-secondary education. Recently, this phenomenon has been evidenced by university efforts to improve the quality of life of students by incorporating programs and services that reach far beyond physical health (Hermon & Hazler, 1999). As these wellness programs emerge in a variety of settings, including corporate America, community centers, and educational settings, there is a need to examine how to construct these programs to include all areas of wellness (Gieck & Olsen, 2007).

Holistic wellness models.

With the limited research and discussion of how to build programs that promote a lifestyle and wellness approach to health promotion, the holistic wellness approach has been given recent attention because of its close theoretical foundation to social cognitive theory (Myers, Luecht, Sweeney, 2004). The holistic wellness model was originally postulated by Hettler (1984) and approaches wellness through six broad dimensions of health-related behavior: physical wellness, emotional wellness, spiritual wellness, social wellness, occupational wellness, and intellectual wellness. These areas are an extension to the widely used definition of wellness by the WHO (1964) that includes physical, mental, and social well-being.

In a recent study by Gieck & Olsen (2007), the researchers adopted Hettler's holistic model of wellness as a means to developing a lifestyle approach to health behavior in obese and sedentary college students. The primary goal of

the study was achieving balance across all areas of wellness through engagement in holistic wellness activities while participating in an 11-week walking program. Walking has become a popular and effective method for increasing levels of cardiorespiratory fitness, decreasing body fat, improving resting metabolic rate, improving levels of lipoproteins, and decreasing blood pressure (Evaluation Panel on the Identification, Evaluation, and Treatment of Overweight Adults, 1998; Kelly, Kelly & VuTran, 2004; Murphy, Nevill, Neville, Biddle, & Hardman, 2002). Through the walking program, gains in the above mentioned areas of health-related fitness were expected as secondary outcomes to achieving balance in the other areas of wellness. Research supports that walking is beneficial in areas besides physical health, such as increasing mood and self-esteem, reducing the risk of depression and anxiety, and reducing levels of stress (Kelly et al., 2004, Murphy et al., 2002).

In the study, the researchers used changes in self-efficacy and knowledge concerning principles of holistic wellness to examine the relationship between these wellness measures and general exercise-related behavior (Gieck & Olsen, 2007). Interestingly, participants experienced increased self-efficacy and knowledge concerning principles of holistic wellness, but also had decreases in body fat. Participants also reported an increase in activity level for general exercise, resistance training, and walking behavior. Most notably, after 1-month, participants who completed the entire intervention continued to engage in behaviors consistent with a holistic approach, particularly using walking as a method of stress reduction. Gieck and Olsen (2007) commented that the study

further demonstrates the importance of a lifestyle and holistic approach to improving all areas of health. Specifically, because developing adult health-related behaviors early on is important, college campuses offer a means to test and develop programs that emphasize the holistic approach (Gieck & Olsen, 2007).

There are additional accepted holistic wellness models used in research to evaluate an individual's overall well-being. Witmer, Sweeney, and Myers (1993) translated many of the theoretical and research concepts of other models and developed a holistic wellness model that originally consisted of 16 dimensions. This model is now categorized into five main areas: (a) spirituality (meaning and appreciation for life); (b) self-regulation (combined variable measuring ability to cope with one's self); (c) work, leisure, and recreation (ability to integrate these activities into daily life); (d) friendship; and (e) love (for self and through social interdependence) (Witmer et al., 1993). A major strength of this model is that it not only includes a wide range of holistic factors, but also, it provides a measurement instrument to assess these factors called the Wellness Evaluation of Lifestyle (WEL) inventory.

The WEL inventory emerged when Witmer and Sweeney (1992) and Myers, Sweeney, and Witmer (2000) offered a holistic model of wellness and prevention over the life span, named the *Wheel of Wellness* (WoW). The WoW was based on interdisciplinary research investigating characteristics of healthy individuals. The researchers included in the WoW only those characteristics for which there existed a well-known observed link with improved quality of life,

longevity, and overall well-being. It was then that the WEL inventory was designed to assess each of the characteristics of wellness identified in the WoW (Myers, Luecht, & Sweeney, 2004). Figure 3 represents the WoW and the holistic approach to a healthy lifestyle (Myers et al., 2000).

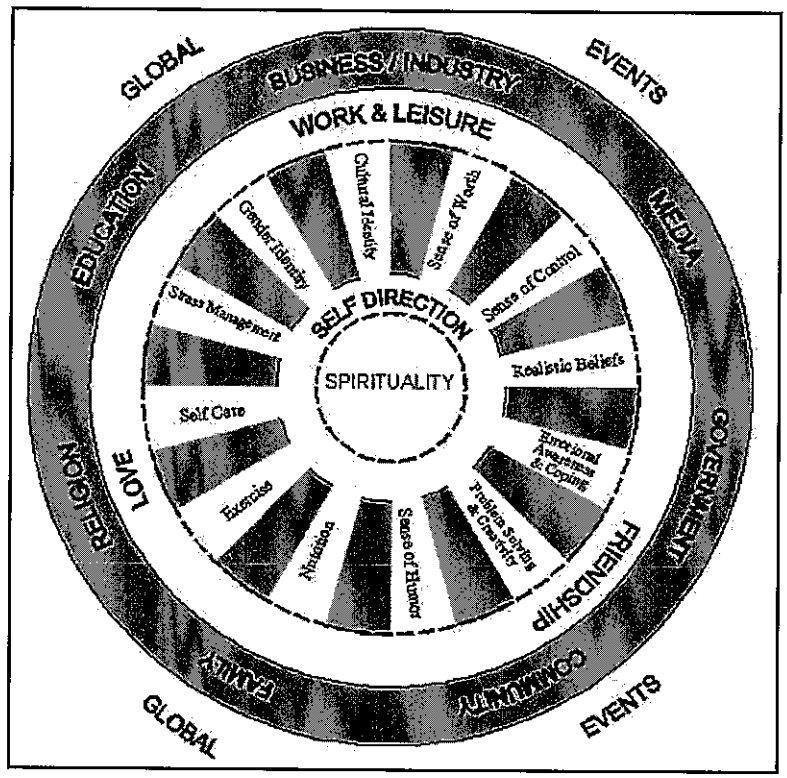

Figure 4. Wheel of Wellness Holistic Approach to a Healthy Lifestyle

From J.M. Witmer, T.J. Sweeney, & J.E. Myers, 1993

Hermon and Hazler (1999) used the WEL inventory to research the relationship between adherence to the aforementioned holistic wellness model and perceptions of psychological well-being in college students. The researchers selected the WEL inventory because its design specifically gives more equal assessment recognition to each dimension of the wellness model (Hermon & Hazler, 1999). They found a significant relationship between reported adherence to a holistic wellness model (as measured by engagement in wellness behaviors

and concordance with wellness philosophy) and two distinct aspects of psychological well-being: state (affective component) and trait (quality of life). Furthermore, the variables self-regulation and work, recreation, and leisure of the wellness model seemed to be the best predictor of college student's psychological well-being state and trait (Hermon & Hazler). The researchers noted the relationship between self-regulation and psychological well-being is consistent with a previous review of research studies that consistently supports the positive relationship between generalized self-efficacy and psychological well-being (Lightsey, 1996).

Hermon and Hazler's (1999) study supports that students who feel successful at tasks related to self-regulation (exercise, nutrition, managing stress, sense of worth, control, intellectual challenge, emotional responsiveness, sense of gender, and cultural individuality) also feel positive about the way their lives are going and therefore could be described as living a balanced, holistic wellness lifestyle (Hermon & Hazler, 1999). For institutions of higher education, this research conducted supports the importance of implementing activities that support self-regulation and control of stress levels for increasing satisfaction with personal and academic experiences. Health promotion programs, counseling services, on-campus health services, and recreation facilities offer support to increase self-regulating behaviors as a result of the structure, education, and opportunity they offer students (Hermon & Hazler). Specifically, wellness programs offer psycho-educational programs targeted at the key components of wellness, including physical, mental, intellectual, and spiritual health

(managing stress, time management, nutrition, physical activity, and cultural and gender awareness) (Hermon & Hazler; Sivik et al., 1992; Witmer & Sweeney, 1992).

1st year college students.

To further evaluate the importance and relevance of wellness programs and initiatives in the college population, a study examined wellness factors specific to first-year college students (Lafountaine, Neisen, & Parsons, 2006). Lafountaine et al. (2006) used the on-line version of the WEL inventory to explore wellness behaviors in this population and compared their results to those of a national sample of college students. First-year college students reported the highest levels of love and sense of worth from the inventory, possibly reflecting the importance of social involvement and connections in this group of students. Previous research states that when students have a strong sense of self-worth, this positive self-esteem makes them more likely to have strong relationships, which reflects higher ratings in the love dimension (Hafen, Frandsen, Karren, & Hooker, 1992). In regards to the nutrition dimension, scores were much lower than other WEL scores reported in the study as students appear to struggle in the transition to the more independent lifestyle that accompanies college (Lafountaine et al., 2006).

Recent research regarding nutrition in this population has found factors such as variety of cafeteria food, cost of food choices, hours of operation, and increased snacking to cope with stress as possible barriers to eating a well-balanced, healthy diet (Hudd et al., 2000). Stress management scores were also

lower than other WEL scores as students reported struggling with recognizing causes of stress and positively coping with stress in ways in which they traditionally coped, for example; speaking with family and familiar friends (Lafountaine et al., 2006). As this population transitions into the college environment, students must balance the demands of rigorous academics, extracurricular activities, and social life, all of which contribute to increased stress levels (Kim & Seidlitz, 2002; Thome & Espelage, 2004).

Lafountaine et al. (2006) compared the results of the study population to those of a national sample of college students and found their sample to have higher scores related to exercise, stress management, and nutrition. However, this may be explained by the age of the study population because first year college students are 18-20 years of age, compared to the national sample of 19-25 years. Additional researchers acknowledged this difference in a study examining traditional versus non-traditional college students and wellness factors (Myers & Mobley, 2004). Myers and Moberly (2004) reported traditional college students may be more likely to continue with exercise programs and diet plans because of routines established and monitored in high school and home. In regards to the exercise component, Myers and Moberly's research is also consistent with previous studies supporting increased exercise adherence for first-year college students as opposed to junior and senior-level students (Grubbs & Carter, 2002, Hermon & Hazler, 1999).

Even so, Lafountaine et al.'s (2006) study contributes to the research supporting the implementation of wellness programs and services on college

campuses. Assisting first-year college students with developing a holistic lifestyle during the college years proves to be a positive contribution to their overall success. Furthermore, college faculties have many opportunities through instruction and advising to discuss a student's overall well-being and direction for the future. By exhibiting a vested interest in the student's future and modeling healthy wellness practices, faculty play a major role in the development of first-year college students (Lafountaine et al., 2006).

Traditional vs. nontraditional students.

While more research is continuing to emerge about the importance of wellness programs, there is a need to examine the design of these programs in order to accommodate both the traditional and nontraditional student. Predictions from the 2000 National Conference of the Adult Learner noted that by 2003, nontraditional-age college students may comprise nearly50% of U.S. college enrollment (Hermon & Davis, 2004). College campuses, including counselors, faculty, and wellness directors, will be faced with challenges of providing services to meet the diverse developmental needs of both traditional and nontraditional students. Therefore, university initiatives need to identify and understand the demographics and diversity of their campus as it relates to developing effective wellness services.

Hybertson, Hulme, Smith, and Holton (1992) examined these two types of students and their perception of factors seen as beneficial or detrimental to their personal wellness. In regards to factors seen as beneficial, nontraditional-aged students stated "balancing my personal needs with the demands from others" as

the most important for personal wellness, and traditional-aged students most frequently chose "knowing who I am, having good self-awareness." When evaluating detrimental factors, nontraditional-aged students stated "feeling overwhelmed or conflicted about fulfilling all my role responsibilities," and traditional-aged students chose "worrying" as detriments to personal wellness (Hybertson et al., 1992). Understanding the differences in perceptions of wellness in traditional versus nontraditional students may help guide the structure of health promotion programs on college campuses (Myers & Moberly, 2004). Additionally, the holistic approach to campus wellness may provide a foundation that allows for wellness programs that meet the needs of all students, including traditional, non-traditional, undergraduate, graduate, and minority students (Myers, Sweeney & Witmer, 2000).

In the study conducted by Myers and Moberly (2004), researchers used the Five Factor Wel (5F-Wel) developed from the Wellness Evaluation of Lifestyle (Myers & Sweeney, 1999) to examine wellness perceptions of traditional and nontraditional students. The 5F-Wel instruments consists of 73 questions that assess five second-order factors: social self (love, friendship), essential self (spirituality, self care), creative self (thinking, emotions), physical self (nutrition, exercise), and coping self (stress management, sense of worth) (Myers & Sweeney, 1999). Results of the between-group comparisons demonstrated that traditional-age undergraduate students, as a whole, are at risk for lower perceived wellness than non-traditional students, most notably in the fifth second-order factor, coping self (Myers & Moberly, 2004). This may be

attributed to perfectionist tendencies and the need to be perceived by others as competent and successful, as well as concerns of not living up to high expectations.

Furthermore, results from Myers and Moberly (2004) showed traditional undergraduates scored lower than nontraditional students on intellectual simulation, problem solving, and creativity which could reflect developmental challenges related to the transition into the college environment. Specific to problem solving, researchers noted the higher scores for nontraditional students may be due to the security that comes from effectively resolving life challenges and a resulting positive view of oneself as an effective problem solver (Myers & Moberly, 2004). Overall, it is possible the difference in the above characteristics may be simply due to nontraditional students being older and more mature than the traditional college population.

In addition to Myers & Moberly's (2004) recent study, a similar study was conducted that used the standard version of the WEL inventory to examine the differences in wellness factors for traditional and nontraditional students. In this study, researchers found nontraditional students reported lower levels of engagement in physical exercise. Because a past study by Hybertson et al. (1992) found nontraditional students to perceive social activities as a main contributor to wellness, the researchers suggested these students incorporate physical activity into social interactions as a means to increase daily exercise (Hermon & Davis, 2004). Another notable difference in these two groups of students was in the reported importance of self care. Nontraditional students reported that they

were more likely to wear a safety belt, schedule medical checkups, get sufficient sleep, wear sunscreens, avoid the use of drugs and tobacco, and limit alcohol intake. This difference in self-care may be partially explained by the *invincibility* of many traditional first- and second-year college students during the transition to the college environment and their engagement in risky health behaviors (Hermon & Davis, 2004).

As stated previously, nontraditional students may also have life experiences that play a major role in their decision making and prioritizing of wellness factors, such as self-care behaviors (Hermon & Davis, 2004; Myers & Moberly, 2004). While researchers found the above stated differences for traditional versus nontraditional college students, there were also many relevant similarities between groups. Nine of the self-regulation tasks and four of the life tasks on the WEL--spirituality; work, recreation, and leisure; friendship; and love--showed no statistical difference between the two student groups (Hermon & Davis, 2004). Therefore, there are many intervention strategies and health promotion programs that can be implemented for both student groups to improve overall wellness and promote a holistic wellness model on the campus.

Spiritual wellness.

One particular area of wellness that deserves attention on college campuses is spirituality and its role in the health and well-being of an individual. Researchers in the field have viewed spirituality as the primary characteristic of healthy individuals, providing the foundation for all other dimensions of wellness (Myers et al., 2000). Yet, despite its importance in the

holistic approach, little current research exists to examine spiritual aspects of health. As stated by Myers et al., (2000), this lack of research may be due to the many definitions of spirituality and the validated tools that exist in research to examine the relationship between spirituality and health. Furthermore, it is important to distinguish the term spirituality from religion; though the terms are related and often intertwined, they are not synonymous.

Spirituality as a dimension of wellness varies among theorists, but common thread exist. These commonalities include a sense of meaning and principle in life, connectedness to self, nature, and a belief in a unifying life force or higher force (Adams et al., 1997; Hawks, Hull, Thalman, & Richens, 1995; Seaward, 1995). Based on these definitions, one is able to see that spirituality can add meaning to religion, whereas the practice of religion can strengthen spirituality. With this in mind, researchers cannot ignore the spiritual importance of organized religion in millions of people's lives, yet they equally understand that one need not practice a specific religion in order to develop spirituality (Adams, Bezner, Drabbs, Zambarano, & Steinhardt, 2000). Understanding this phenomenon plays a vital role in how wellness programs are structured to include a spiritual dimension of wellness, while respecting individual beliefs and religious affiliations.

In 2000, Adams et al. studied the relationship among spiritual wellness, psychological wellness, and overall wellness in the college population. The researchers used the Life Purpose subscale from the Life Attitude Profile (LAP) to measure spiritual wellness, the Life Orientation Test and the Sense of

Coherence Scale to measure psychological wellness, and the Perceived Wellness Survey to measure overall wellness. The Life Purpose subscale is defined by 9 items that measure zest for life, fulfillment, contentment, and satisfaction (Reker & Peacock, 1981). The Life Orientation Test uses 8 items to measure optimism. The Perceived Wellness Survey consists of 36 questions that measure a person's perceived sense of living in a manner that permits balanced growth in the emotional, intellectual, physical, psychological, social, and spiritual dimensions of the human existence (Adams et al., 1997). Statistical analyses showed a relationship among life purpose, optimism, and sense of coherence with perceived wellness in the sampled college population (Adams et al., 2000).

The researchers predicted the relationships may exist for one overarching reason. First of all, most college students' environments consists of fast-paced class schedules, increased stress levels, extracurricular activities, and the pursuit of money and success (Kim & Seidlitz, 2002; LaFountaine et al., 2006; Thome & Espelage, 2004). Therefore, maintaining a sense of meaning and purpose in life under these day-to-day conditions would require strong internal resources. Adams et al. (2000) suggested optimism and a sense of coherence are perhaps types of internal resources that enable students to continue to fulfill their purpose in life, despite environmental obstacles. Thus, the researchers were not surprised that the effects of life purpose on perceived wellness in college students were mediated by psychological constructs, such as optimism and sense of coherence (Adams et al., 2000). This research continues to support

the importance of many dimensions of wellness as part of a holistic approach to student health and well-being.

Perceptions of wellness.

As stated above, spirituality and psychological wellness may be the foundation that shapes all other areas of wellness in college students (Adams et al., 2000; Myers et al., 2000). Therefore, it would be important for health promotion programs on college campuses to construct programs that encompass these dimensions as an avenue to improve other areas of wellness, such as physical health. In a very recent study, researchers used a similar theoretical basis and examined psychological perceptions to walking, water aerobics, and yoga in college students (Wei, Kilpatrick, Naquin & Cole, 2006). The researchers predicted those students who engaged in those physical activities would have perceived improvements in psychological wellness. While not measured in this study, theoretically, those students who perceive improved psychological wellness may likely continue to engage in physical activities, improving physical health indicators.

The Wei et al. (2006) study measured perceptions of anxiety (State Anxiety Inventory [SAI]), exertion and pain (Ratings of Perceived Exertion Scale [RPE]), and arousal and mood (Felt Arousal Scale [FAS]) following sessions of walking, water aerobics, and yoga. The results showed that following all modes of exercise, anxiety was significantly reduced in sampled college students. Furthermore, arousal level was lowest in yoga, reflecting the calming and relaxation that accompanies this type of exercise session. Yoga has also been

believed to be a spiritual experience for many who engage in this type of exercise due to the meditative states that exercisers engage in during yoga sessions (Kasiganesan, Anand, Malhotra, Karan, Rajendra, Rajesh, Trilok, Lajpat & Ramesh, 2004). Lastly, mood levels, reflective of positive thinking and optimistic outlooks, were significantly improved for all modes but were more positive following walking and water aerobics (Wei et al., 2006). This study supports the holistic approach to health promotion programs on college campuses by contributing to the research on perceptions of psychological wellness and involvement in physical activities.

The perception of college students in regards to the importance of overall wellness warrants attention for college health professionals who design and implement health initiative programs. Recently, much attention has been given to how and why students form perceptions and how to influence these perceptions that prove to be so important to living a holistic lifestyle. One of the most researched theories on why students may perceive holistic wellness as of low importance is that it may be due to the perceptions and stereotypes of physical education at many academic levels (Coelho, 2000; McCormick, 2006; Stelzer, Ernest, Fenster & Langford, 2004). In today's society, physical education classes often are stereotyped to be secondary to the core subject areas and, therefore, often seen as less important by administrators, teachers, parents, and students. This stereotype is evidenced in the mass reduction in physical education classes offered at the elementary, middle school, high school, and post-secondary levels across the United States (Cawley et al., 2006). The level of

importance being placed on physical education and wellness in the educational system may very well have a negative impact on perceptions of students. Freeman (2001) stated many professionals in the field of physical education and wellness struggle to understand the discipline as a profession and how it fits into the overall academic setting. Those professionals struggling to understand the role of the discipline most likely fail to challenge student's knowledge of the subject area and, therefore, contribute to negative perceptions of physical education and wellness-based education (McCormick, 2006).

Recently, researchers examined college student perceptions of wellness concepts in order to further enhance the importance of holistic wellness in the post-secondary academic setting. Physical education and wellness courses have been perceived as basic and simplistic academic courses that are secondary to the core subject areas. Due to this perception, many students tend to view their *self knowledge* of the material much higher than the core subject areas (Wilson & Dunn, 2004). Wilson and Dunn further defined self-knowledge as a disconnect between implicit and explicit knowledge of wellness concepts. For example, some students feel they do not need a wellness-based course because they believe they already have the knowledge of the course content; this is known as explicit knowledge. In contrast, implicitly, students may not have true depth of knowledge and a complete understanding of the material in the course (Coelho, 2000; Mack, Mick, & Shaddox, 2004; McCormick, 2006). Therefore, based on this perceived self-knowledge, students may not enroll in an elective wellness-based course at the university level, unless the general education curriculum mandates

such a requirement. Instructors teaching wellness-based courses have reported struggling with this explicit knowledge of students when identifying objectives and assessments for the course (McCormick, 2006).

In 2006, McCormick researched college student perceptions of wellness concepts. Specifically, his study examined baseline wellness perceptions and knowledge levels of students, including the differences between pre- and post-perception of knowledge and actual pre- and post-knowledge. The study participants were university students enrolled in a required traditional semester Physical Education – Lifetime Wellness course. Students were asked to evaluate their perceived knowledge on the following topics from the textbook *Fit and Well: Core Concepts and Labs in Physical Fitness and Wellness*, 5th ed., by Fahey, Insel, and Roth (2002): basic wellness concepts, nutrition, principles and components of fitness, body composition, stress management, health-related diseases, substance abuse, sexually transmitted diseases, and lifetime wellness.

In McCormick's study (2006), following initial questions regarding perceptions of knowledge, students took a written exam. The written exam asked questions in all of the above stated areas to assess actual knowledge of the material. Statistical analyses revealed post-perception scores were significantly higher than pre-perception scores for all topics. Therefore, after completing a semester-long wellness course, students' perceptions of knowledge in all dimensions of wellness were improved. Additionally, post-knowledge scores were significantly higher than pre-knowledge scores for all topics, supporting the notion that not only did explicit knowledge improve (perceived knowledge), but

implicit knowledge (actual knowledge) also improved (Coelho, 2000; Mack, Mick, & Shaddox, 2004; McCormick, 2006; Wilson & Dunn, 2004). This study supports the inclusion of wellness-based courses into the general education curriculum at the university level. Despite explicit knowledge, students who participate in a wellness-based course do have improved knowledge regarding the dimensions of wellness and living a holistic lifestyle. Based on these findings, there are universities that have embedded a wellness requirement into part of the general education curriculum for an associate's or bachelor's degree, such as Brigham Young University, St. Cloud State University, University of Richmond, Earlham College, Southern Methodist University, Binghamton University, Oakland University, Columbia College, Washburn University, North Dakota State University, Minot State University, Eastern Kentucky University, and Grossmount College.

Summary

The United States continues to battle the obesity epidemic along with other health concerns in children, young adults, and adults. It seems important for the educational arena to take responsibility for the health of all citizens, regardless of age, and consider the benefits of a holistic wellness approach to the general education curriculum. Furthermore, as universities move forward with wellness initiatives and holistic programming, it is necessary to identify perceptions of students for these programs to ensure optimal participation and success. The ACHA Standards for Health Promotion in Higher Education have identified key standards to be followed by universities when implementing

health initiatives; standard five states successful programs "understand and apply evidence-based approaches to health promotion" (ACHA, 2004, p. 4). Evidence shows that students must perceive wellness as important in their lives or they may not want to be involved in programs or courses that promote a well, holistic lifestyle (Coelho, 2000; Mack, Mick, & Shaddox, 2004; McCormick, 2006; Wilson & Dunn, 2004).

In general, students are knowledgeable about the health of the nation's adults and children and the role of physical education and wellness, and in most cases, they understand and support its application in schools. Research indicates that youth and young adults are very receptive to the idea of school-based intervention programs for managing weight and promoting a healthy lifestyle (Neumark-Sztainer & Story, 1997) Neumark-Sztainer and Story conducted a study that assessed perceptions of intervention programs for overweight and obese students and received positive feedback from the students. Students noted they would welcome an intervention program as long as it presented a supportive environment that was tailored to meet their needs. In 2002, a poll conducted by Action for Healthy Kids showed 81% of 1,308 student leaders surveyed thought that schools should make healthy eating a top priority, and the majority, 72%, believed that schools should make physical activity more accessible and a priority.

While school-based intervention programs provide a method to help overweight and obese students reach a healthy weight and learn lifestyle behaviors, educators must be sensitive to the psychological effect of obesity and

weight concerns. Interventions should be targeted at achieving a healthy weight rather than losing weight or obtaining a particular weight (Society for Nutrition Education: Weight Realities Division [SNEWRD], 2003). Additionally, various eating problems including obesity, eating disorders, malnutrition, and weight-based social discrimination seems to be associated with each other; therefore, these issues should be addressed with caution (SNEWRD, 2003). The most successful intervention programs involve a support system that includes educators, student counselors, nurses, and career guidance counselors, as well as behavior management, nutrition education, and increased daily physical activity (Pyle et al., 2006).

In conclusion, it seems very evident that well-structured, active, physical education courses are a key factor in the fight against obesity and sedentary lifestyles. These courses provide an avenue for young adults to be physically active and develop lifelong behaviors for an active lifestyle. Wellness-based courses encompass all dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual that research supports provides a foundation for a holistic lifestyle (Myers et al., 2000). Many universities have already included such courses as part of the general education curriculum for an associate's or bachelor's degree. Educators, administrators, counselors, and advisors are encouraged to examine the positive impact wellness education could have on the academic success and overall well-being of students.

CHAPTER III - METHODOLOGY

Overview

The intent of this study was to examine the outcomes of a university wellness-based course on health indicators and self-perceived wellness dimensions physical, psychological, emotional, intellectual, social, and spiritual, on the college population. This study builds upon existing research and provides a foundation for future research on college populations. All study procedures were approved by Lindenwood University's Institutional Review Board (IRB) (Appendix A) prior to the initiation of data collection and completion of the study. Pre-screening information was collected on all subjects, as well as pre-test and post-test assessments for physical health indicators and Perceived Wellness Survey data.

Problem Statement

There is limited current research in the area of physical fitness/health and its relationship to the six dimensions of wellness. Specifically, the college population appears to be particularly under-represented in health and wellness research literature in support of campus wellness programs and initiatives. The purpose of this study was to evaluate outcomes of a 15-week university wellness-based course on health indicators and six areas of wellness: physical, psychological, emotional, intellectual, social, and spiritual. The research hypotheses tested the supposition that participants in the intervention group would experience significant health benefits from program participation. Additionally, in regards to the dimensions of wellness, the research study

examined whether participants in an intervention group would report increases in physical wellness, psychological wellness, emotional wellness, intellectual wellness, social wellness, and spiritual wellness.

Subjects

Study participants were enrolled in the following Health & Fitness Sciences courses at Lindenwood University: PE 200 Health & Nutrition, PE 150 Foundations of Physical Education, PE 320 Psychological and Sociological Aspects of Physical Education, EXS 100 Foundations of Sport and Exercise Science, and AT 295 Introduction to Athletic Training. Students were recruited verbally by the primary investigator during the first week of fall semester classes.

Students in PE 200 Health & Nutrition were formally invited to participate in the 15-week wellness-based course and STEPS intervention program. The control group was comprised of undergraduate students in PE 150 Foundations of Physical Education, PE 320 Psychological and Sociological Aspects of Physical Education, EXS 100 Foundations of Exercise Science, and AT 295 Introduction to Athletic Training. These students were not formally invited to participate in the 15-week wellness-based course and STEPS intervention program. All subjects completed pre-test and post-test data for physical health indicators and Perceived Wellness Survey data.

There were a total of 133 students that completed the pre-screening forms and were enrolled in the study. Following the collection of all post-test data, 124 students from Lindenwood University had completed all pre-screening forms,

pre-test data, and post-test data to be included in the statistical analyses. Student exclusions from the analyses were due to the following reasons: (a) dropping the academic course during the time of the study, (b) not completing all pre-test and post-test data, and (c) pregnancy during the initiation of the study (one student).

Based on group frequencies, the intervention and control groups were homogeneous and did not manifest any statistically significant differences in characteristics. Table 1 represents a summary of the subject characteristics for the intervention and control groups.

Table 1

Subject Characteristics for the Intervention and Control Group

Variable	N	% of group
Gender-Male		
Control Group	66	57.6%
Intervention Group	58	72.4%
Gender-Female		
Control Group	66	42.4%
Intervention Group	58	27.6%
Student-Athletes		
Control Group	66	70.7%
Intervention Group	58	65.2%
Sophomore/Junior (≤ 72 credit hours)		
Control Group	66	72.4%
Intervention Group	58	67.2%
Major-Physical Education, Exercise Science, or Athletic Training)		
Control Group	66	65.1%
Intervention Group	58	65.5%

Sampling Procedure

Students had to be enrolled in PE 150 Foundations of Physical Education, PE 200 Health & Nutrition, PE 320 Psychological and Sociological Aspects of Physical Education, EXS 100 Foundations of Exercise Science, or AT 295 Introduction to Athletic Training to be recruited for the study. An informed consent (Appendix B) was required for participation in the voluntary study and was required for all subjects. No participant under the age of 18 was included in the study; therefore, parental consent was not necessary for participation. If for any reason a student needed additional assistance in understanding the language and information in the informed consent, assistance from the Student Counseling and Resource Center and/or International Office was offered to assist the student.

All recruited students were required to complete a Physical Activity Readiness Questionnaire (PAR-Q) (Appendix C) prior to the collection of assessment data. The PAR-Q is standard protocol for participating in low to moderate intensity physical activity programs. Additionally, a Lindenwood University liability waiver (Appendix D), required for participation in university-related physical education courses, intramurals, and sports, was required for all participants. Any person who did not complete the pre-screening forms was excluded from the study.

Research Setting

The study was conducted on Lindenwood University's campus. All pre-test and post-test health assessments and pre-test and post-test Perceived Wellness

Survey information was collected in the Hyland Performance Arena and Field House classrooms. The health assessments were collected in a semi-private setting, allowing for student comfort and confidentiality.

Research Design

This study was a quantitative, quasi-experimental design using a non-random convenience sample taken from classes within the Health and Fitness Sciences curriculum at Lindenwood University. This type of design is used frequently in education where researchers use existing intact groups, such as classrooms, to form intervention and control groups (Fraenkely & Wallen, 2007). Data were collected for all subjects during week 1 and week 15 of the regular Fall semester. In order to ensure confidentiality, each subject was given a unique identification (UI) number and only the primary investigator had access to the UI. The number was randomly assigned to the subject using a random numbers table and was used to ensure that pre-test and post-test assessments were recorded properly and corresponded to each subject. All paper data including pre-test and post-test data were kept in a locked box in the primary investigator's office. All electronic data were password-protected and only the primary investigator and committee chair had access to group data.

During the first week of the regular fall semester, all subjects completed non-invasive, pre-test assessment data, including body mass index, body composition analysis, blood pressure, and resting heart rate. The data were collected predominantly by the primary investigator with assistance from Health and Science faculty. The primary investigator and assisting faculty have expert

knowledge and training in using the required instruments to collect these assessments. Additionally, all subjects completed the Perceived Wellness Survey to evaluate perceptions in the six dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual. During week 15 of the regular Fall semester, all students completed the same post-test assessment and Perceived Wellness Survey instrument.

Students enrolled in PE 200 Health and Nutrition received the 15-week wellness-based intervention program. The intervention group was provided physical activity, nutrition, and wellness education, following the textbook, *Total Fitness and Wellness* (5th ed.), by Powers & Dodd. The education was specific to the six dimensions of wellness and delivered by the primary investigator. The course followed the regular academic semester and was 15 weeks in duration, meeting 3 times per week for approximately 50 minutes per session. Specifically, the following textbook chapters were covered throughout the semester: physical fitness, nutrition, disease prevention, stress management, substance abuse/tobacco/alcohol use, spiritual wellness, and lifetime wellness. Additionally, the intervention group used an online physical activity tracking tool, STEPS, to log daily physical activity. Participants logged activity by entering total minutes of moderate and/or vigorous activity each week. Participants were able to set physical activity goals and monitor progress through the online program.

Instrumentation

The following non-invasive pre-test and post-test health assessments were collected on all subjects: body mass index, blood pressure, body composition and resting heart rate. Faculty in the Health and Fitness Sciences conducted the assessments using standardized equipment following the proper testing protocols. Body mass index and body composition were calculated using a hand-held grip electronic body composition analyzer. Weight was taken using an electronic scale for use in the body mass index equation. Blood pressure was calculated using a manual sphygmomanometer and stethoscope and taken on the left arm of all subjects. Resting heart rate was taken manually on the radial artery (wrist) and measured using a 10 second count on a stop watch. All subjects were requested to sit quietly for 2-3 minutes prior to obtaining blood pressure and resting heart rate measurements.

Perceived Wellness Survey

The Perceived Wellness Survey (Appendix E) is a widely used instrument in the field of health and wellness designed to evaluate perceptions of the six dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual health (Adams, Bezner, Garner, & Woodruff, 1998). The survey consists of 36 statements in regards to self-perceptions, such as; "I am always optimistic about my future," "I expect to always be physically healthy," and "My life has often seemed void of positive mental stimulation." There are 6 statements that correspond to each dimension of wellness and are rated on a scale of 1-6 with 1 representing *strongly disagree* and 6 representing *strongly*

agree. As a result of answering all 36 statements, a composite score is calculated using standard and reverse scoring for each dimension of wellness, with a possible range from 6 to 36 for each dimension.

In a study by Adams et al. (1998) the researchers examined the construct validity of the Perceived Wellness Survey and found in all but three analyses, the highest and lowest perceived wellness groups were significantly different providing strong support for the construct validity of the Perceived Wellness Survey. In all but two instances (emotional autonomy and organizational communication), the independent variable scale reliabilities were more than adequate ($\mu = .70$) adding strength to these findings. In another study, the Perceived Wellness Survey was shown to have excellent estimates of factorial and construct validity, as well as internal consistency reliability ($\alpha = .91$) (Adams et al., 1997).

STEPS Online Tracking Tool

The online physical activity tracking program was administered through the website, 10,000 Steps, a grant-funded university-based website. The goal of 10,000 Steps is a "whole of community" health promotion physical activity project funded by Queensland Health (www.10000steps.org.au/). In 2001, the Rockhampton region was chosen for a two year trial of the project as the residents showed *typical* levels of inactivity. During these two years, the 10,000 Steps Rockhampton Project was an exemplary model of an effective multi-strategy, multi-sector physical activity project. The project has been successful in

motivating local communities, workplaces, and individuals to increase their physical activity levels.

As a result of the success in Rockhampton, Queensland Health has extended the grant funding, and the project is currently a sustainable statewide and beyond initiative. 10,000 Steps is committed to ongoing research, development, distribution and support of new and existing 10,000 Steps support materials at the local, state and national level, all with web-based support. The aim of the program is to increase participation in physical activity through the state and nation (Queensland Health, 2008, p. 1).

Reliability

In order to ensure internal consistency of the Perceived Wellness Survey responses, reliability analyses were run on the six dimensions of wellness. Table 2 summarizes the results of these analyses.

Table 2

Measure of Internal Consistency for Perceived Wellness Scale (N = 124)

Subscale	# of items	Alpha Reliability
Psychological Health	6	.7447
Emotional Health	6	.7266
Social Health	6	.6831
Physical Health	6	.7755
Spiritual Health	6	.7976
Intellectual Health	6	.7810

Nunnally (as cited in Churchill, 1979) suggested that reliabilities of .60 to .80 are acceptable in the early stages of basic research; therefore, all scales were retained with no item deletion.

Threats to Internal and External Validity

The following data tables provide a summary of the threats to valid inferences. Valid inferences refer to conclusions and generalizations that might be drawn from the effects of the independent variable on the dependent variable (Kirk, 1982). Cook and Campbell (1979) suggested three categories of threats to valid inferences: internal validity, external validity, and statistical conclusion validity. All threats to valid inferences were observed and controlled wherever possible. Tables 3, 4, and 5 represent a complete listing of threats to valid inferences.

Table 3

Threats to Internal Validity

Threat	Controlled	Explanation
History	Partially	To the primary investigator's knowledge study participants had not had another wellness-based course
Maturation	Yes	Short-term intervention allowed comparisons to be made over 15 weeks
Testing	No	Test-retest reliabilities were within acceptable parameters
Instrumentation	Yes	The same instrument was used for pre- and post-test under like situations.
Statistical Regression	Yes	Participants were homogeneous in subject characteristics
Selection Bias	Partially	Subjects were assigned using a random convenience sample
Mortality	Partially	Some attrition due to dropping an academic course or incomplete data
Causal Time Order	Yes	Survey data were collected systematically
Diffusion	Yes	No known contact was made between intervention and control group during the course of the intervention
Demoralization	Yes	The control group was not administered any negative treatment or treated fairly
Compensatory Rivalry	Yes	The control and intervention group were kept mutually exclusive
Compensation	Yes	Neither group was provided compensation for participation

Table 4

Threats to External Validity

Threat	Controlled	Explanation
Multiple Treatment Interference	Partially	Students may have been involved in other wellness activities
Reactive Effects of Experimental Setting	Yes	The program was conducted in settings familiar to participants
Interaction of Selection Biases-Treatment	Yes	The intervention group was formed based on the wellness-Based course enrollment

Table 5

Threats to Statistical Conclusion Validity

Threat	Controlled	Explanation
Low Statistical Power	Yes	Sample consisted of > 30 subjects
Reliability of Measures	Partially	Conducted reliability analyses to ensure internal consistency of items
Statistical Assumptions	Yes	
Random Heterogeneity	Yes	No significant differences were found among respective groups on select variables
Reliability of Treatment Implementation	Yes	There was 1 group receiving the intervention by the same facilitator and set curriculum

Statistical Treatment of Data

For each data group, the control and STEPS intervention group pre-test and post-test data were analyzed for physical health indicators and the Perceived Wellness Survey. All data were analyzed following the completion of all post-test data collection after week 15 of the regular Fall semester. The first step in the analysis process was to ensure accuracy by performing data cleaning procedures. Frequencies and descriptive statistics were run to examine the correctness of all hand-entered numeric data prior to the analyses. Any outliers or numeric errors were re-examined and double checked using the hard copy data entry form and the unique identifier for each subject. Following the completion of data cleaning, the appropriate data analyses were run to address the research hypotheses.

In order to address the research hypotheses, a series of paired sample t-tests were conducted for the control and STEPS intervention group to compare physical health indicators (body mass index, body composition, blood pressure, and resting heart rate) and perceptions of the six dimensions of wellness (physical, psychological, emotional, intellectual, social, and spiritual health).

To further investigate within group changes over time, a one group repeated measures ANOVA was conducted for all physical health indicators and dimensions of wellness for the control and STEPS intervention group. At significant levels, post hoc paired t-tests were conducted to further examine the significance. All data analyses were completed using Statistical Package for the Social Sciences (SPSS) version 11.0.

Summary

This was an exploratory study examining the outcomes of a 15-week wellness-based course on health indicators and perceived wellness in the college population. All subjects completed pre-test and post-test data for physical health indicators and the Perceived Wellness Survey. The researcher hypothesized that those subjects in the intervention program would experience improved health benefits and report increased perceptions of the six dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual health.

Positive health outcomes and perceptions of wellness seen in the intervention group would support the implementation of university wellness programs and a holistic approach to foster academic success. Recently, many universities have added wellness-based courses as part of the general education curriculum. These courses are geared towards incoming freshmen and transfer students to assist in the transitional period to the university environment and ensure a successful start to college. Overall, the outcomes of this study will further add to the wellness research needed to support the implementation of wellness programs, initiatives, and courses in the college population.

CHAPTER IV – RESULTS

Introduction

The purpose of this study was to examine the outcomes of a university wellness-based course on health indicators and self-perceived wellness dimensions: physical, psychological, emotional, intellectual, social, and spiritual in a college population. The sample included 124 students who were used in the data analyses to address the research hypotheses.

Analysis of Data

Table 6 represents a summary of the descriptive statistics for the health indicators for the control group.

Table 6

Descriptive Statistics for Health Indicators for the Control Group

Paired Variable		Mean	N	Std. Dev
Body Mass Index	Pre-test	23.98	58	2.77
	Post-test	23.87	58	2.70
Systolic Blood Pressure (mmHg)	Pre-test	119.76	58	11.65
	Post-test	120.90	58	10.99
Diastolic Blood Pressure (mmHg)	Pre-test	77.34	58	5.46
	Post-test	79.55	58	5.01
Body Composition (fat mass %)	Pre-test	16.09	58	6.13
	Post-test	15.96	58	6.29
Resting Heart Rate (beats/minute)	Pre-test	68.10	58	9.86
	Post-test	70.28	58	11.10

To address the research hypotheses, a paired sample t-test was carried out to compare physical health indicators (body mass index, body composition, blood pressure, and resting heart rate) in the control group. The summary of results is displayed in Table 7.

Table 7

Paired Sample T-test for Health Indicators for Control Group

Paired Variable	t	df	Sig.
Body Mass Index			
Pre-test & Post-test	.453	57	.652
Systolic Blood Pressure (mmHg)			
Pre-test & Post-test	-.655	57	.515
Diastolic Blood Pressure (mmHg)			
Pre-test & Post-test	-2.763	57	.008**
Body Composition (fat mass %)			
Pre-test & Post-test	.431	57	.668
Resting Heart Rate (beats/minute)			
Pre-test & Post-test	-1.345	57	.184

Note. *p < .05; **p < .01; ***p < .001

There was no significant difference in pre-test and post-test scores for body mass index, systolic blood pressure, body composition, and resting heart rate. There was a statistically significant ($p < .01$) difference in diastolic blood pressure, representing an increase in the post-test scores for the control group.

Table 8 represents a summary of the descriptive statistics for the health indicators for the intervention group.

Table 8

Descriptive Statistics for Health Indicators for Intervention Group

Paired Variable		Mean	N	Std. Dev
Body Mass Index	Pre-test	24.68	66	4.04
	Post-test	25.25	66	4.13
Systolic Blood Pressure (mmHg)	Pre-test	118.88	66	3.76
	Post-test	118.55	66	11.51
Diastolic Blood Pressure (mmHg)	Pre-test	77.79	66	7.67
	Post-test	76.68	66	6.28
Body Composition (fat mass %)	Pre-test	18.12	66	7.38
	Post-test	19.00	66	7.53
Resting Heart Rate (beats/minute)	Pre-test	73.45	66	10.43
	Post-test	69.33	66	9.30

To address the research hypotheses, a paired sample t-test was carried out to compare physical health indicators (body mass index, body composition, blood pressure, and resting heart rate) in the intervention group. The summary of results is in Table 9.

Table 9

Paired Sample T-test for Health Indicators for Intervention Group

Paired Variable	t	df	Sig.
Body Mass Index			
Pre-test & Post-test	-2.128	65	.037*
Systolic Blood Pressure (mmHg)			
Pre-test & Post-test	.259	65	.797
Diastolic Blood Pressure (mmHg)			
Pre-test & Post-test	1.399	65	.166
Body Composition (fat mass %)			
Pre-test & Post-test	-1.907	65	.061
Resting Heart Rate (beats/minute)			
Pre-test & Post-test	3.135	65	.003**

Note. *p < .05; **p < .01; ***p < .001

There was no significant difference in pre-test and post-test scores for systolic blood pressure, diastolic blood pressure, and body composition. There was a statistically significant ($p < .05$) difference in body mass index and a significant difference ($p < .001$) in resting heart rate.

Table 10 represents a summary of the descriptive statistics for the between group differences for the health indicators for the control group and intervention group for post-test.

Table 10

Descriptive Statistics for Between Group Differences for Health Indicators

Variable	N	Mean	St. Dev.	CS*
Body Mass Index				
Control	58	23.87	2.70	-.11
Intervention	66	25.25	4.13	.57
Systolic Blood Pressure (mmHg)				
Control	58	120.90	10.99	1.14
Intervention	66	118.55	12.26	-.33
Diastolic Blood Pressure (mmHg)				
Control	58	79.55	5.01	2.21
Intervention	66	76.68	6.28	-1.11
Body Composition (fat mass %)				
Control	58	15.96	6.29	-.13
Intervention	66	19.00	7.53	.88
Resting Heart Rate (beats/minute)				
Control	58	70.28	11.10	2.18
Intervention	66	69.33	9.30	-4.12

Note. *CS = change score

To further investigate within group changes over time, a one group repeated measures ANOVA was conducted for all physical health indicators for the control and [STEPS] intervention group. Table 11 illustrates the results.

Table 11

Analysis of Variance for Health Indicators Control vs. Intervention for Post-Test Scores

Variable	Sum of Squares	df	MS	F	Sig.
Body Mass Index					
Between Groups	58.75	1	58.75	4.70	.032*
Within Groups	1524.69	122	12.50		
Total	1583.44	123			
Systolic Blood Pressure (mmHg)					
Between Groups	170.64	1	170.64	1.25	.266
Within Groups	16653.74	122	136.51		
Total	16824.39	123			
Diastolic Blood Pressure (mmHg)					
Between Groups	254.26	1	254.26	7.77	.006*
Within Groups	3994.66	122	32.74		
Total	4248.93	123			
Body Composition (fat mass %)					
Between Groups	286.41	1	286.41	5.89	.017*
Within Groups	5934.73	122	48.65		
Total	6221.14	123			
Resting Heart Rate (beats/minute)					
Between Groups	27.43	1	27.43	.264	.608
Within Groups	12654.25	122	103.72		
Total	12681.68	123			

Note. *p < .05; **p < .01; ***p < .001

No significant changes were seen between groups for systolic blood pressure and resting heart rate. According to means, body mass index and body composition were significantly higher in the intervention group. Diastolic blood pressure was significantly lower in the intervention group.

Table 12 represents a summary of the descriptive statistics for the six dimensions of wellness for the control group.

Table 12

Descriptive Statistics for Perceived Wellness Survey Control Group

Paired Variable		Mean	N	Std. Dev
Psychological Health	Pre-test	25.03	58	3.59
	Post-test	26.38	58	4.12
Emotional Health	Pre-test	25.98	58	3.12
	Post-test	26.29	58	4.34
Social Health	Pre-test	26.00	58	3.66
	Post-test	27.76	58	4.31
Physical Health	Pre-test	27.47	58	3.50
	Post-test	27.64	58	4.73
Spiritual Health	Pre-test	26.12	58	4.17
	Post-test	27.74	58	4.59
Intellectual Health	Pre-test	23.81	58	3.46
	Post-test	26.03	58	4.27

To address the research hypotheses, a paired sample t-test was carried out to compare the six dimensions of wellness (physical, psychological, emotional, intellectual, social, and spiritual health) in the control group. The summary of results is in Table 13.

Table 13

Paired Sample T-test for Perceived Wellness Survey for Control Group

Paired Variable	t	df	Sig.
Psychological Health			
Pre-test & Post-test	-2.193	57	.032*
Emotional Health			
Pre-test & Post-test	-.497	57	.621
Social Health			
Pre-test & Post-test	-2.960	57	.044**
Physical Health			
Pre-test & Post-test	-.280	57	.780
Spiritual Health			
Pre-test & Post-test	-2.394	57	.020*
Intellectual Health			
Pre-test & Post-test	-3.611	57	.001***

Note. *p < .05; **p < .01; ***p < .001

There was no significant difference in pre-test and post-test scores for emotional health and physical health. There was a statistically significant ($p < .05$) difference in psychological health and spiritual health, as well as a significant difference ($p < .01$, $p < .001$) found for social health and intellectual

health. These significant changes represent an increase in the post-test scores for the control group.

Table 14 represents a summary of the descriptive statistics for the six dimensions of wellness for the intervention group.

Table 14

Descriptive Statistics for Perceived Wellness Survey Intervention Group

Paired Variable		Mean	N	Std. Dev
Psychological Health	Pre-test	25.83	66	3.06
	Post-test	29.59	66	4.26
Emotional Health	Pre-test	26.65	66	3.76
	Post-test	29.33	66	4.59
Social Health	Pre-test	27.48	66	3.67
	Post-test	30.21	66	4.44
Physical Health	Pre-test	28.08	66	3.72
	Post-test	30.32	66	4.61
Spiritual Health	Pre-test	27.08	66	4.17
	Post-test	30.97	66	4.35
Intellectual Health	Pre-test	24.29	66	3.10
	Post-test	28.39	66	4.54

To address the research hypotheses, a paired sample t-test was carried out to compare the six dimensions of wellness (physical, psychological, emotional, intellectual, social, and spiritual health) in the intervention group. The summary of results is in Table 15.

Table 15

Paired Sample T-test for Perceived Wellness Survey for Intervention Group

Paired Variable	t	df	Sig.
Psychological Health			
Pre-test & Post-test	-7.276	65	.000***
Emotional Health			
Pre-test & Post-test	-4.358	65	.000***
Social Health			
Pre-test & Post-test	-3.903	65	.000***
Physical Health			
Pre-test & Post-test	-3.377	65	.000***
Spiritual Health			
Pre-test & Post-test	-5.557	65	.000***
Intellectual Health			
Pre-test & Post-test	-7.213	65	.000***

Note. *p < .05; **p < .01; ***p < .001

There was a statistically significant (p <.001) difference in all dimensions of wellness for the intervention group. This difference represents an increase in reported scores in the six dimensions (physical, psychological, emotional, intellectual, social, and spiritual health).

Table 16 represents a summary of the descriptive statistics for the between group differences for the six dimensions of wellness for the control group and intervention group.

Table 16

Descriptive Statistics for Between Group Differences for Perceived Wellness Survey

Variable	N	Mean	ST. Dev.	CS*
Psychological Health				
Control	58	26.38	4.12	1.35
Intervention	66	29.59	4.26	3.76
Emotional Health				
Control	58	26.29	4.34	.31
Intervention	66	29.33	4.59	2.68
Social Health				
Control	58	27.76	4.31	1.76
Intervention	66	30.21	4.44	2.73
Physical Health				
Control	58	27.64	4.73	.17
Intervention	66	30.32	4.61	2.24
Spiritual Health				
Control	58	27.74	4.59	1.62
Intervention	66	30.97	4.35	3.89
Intellectual Health				
Control	58	26.03	4.27	2.22
Intervention	66	28.39	4.54	4.10

Note. *CS=change score

To further investigate within group changes over time, a one group repeated measures ANOVA was conducted for all six dimensions of wellness for the control and [STEPS] intervention group. Table 17 illustrates the results.

Table 17

Analysis of Variance for Perceived Wellness Survey Control vs. Intervention for Post-Test Scores

Variable	Sum of Squares	df	MS	F	Sig.
PsychologicalHealth					
Between Groups	318.41	1	318.41	18.09	.000***
Within Groups	2147.61	122	17.60		
Total	2466.02	123			
Emotional Health					
Between Groups	285.34	1	285.34	14.26	.000***
Within Groups	2440.68	122	20.01		
Total	2726.02	123			
Social Health					
Between Groups	185.83	1	185.83	9.68	.002**
Within Groups	2341.65	122	19.19		
Total	2527.48	123			
Physical Health					
Between Groups	221.77	1	221.77	10.17	.000***
Within Groups	2659.72	122	21.80		
Total	2881.48	123			
Spiritual Health					
Between Groups	321.74	1	321.74	16.17	.000***
Within Groups	2427.06	122	19.89		
Total	2748.80	123			
Intellectual Health					
Between Groups	171.86	1	171.86	8.81	.004**
Within Groups	2379.69	122	19.51		
Total	2551.55	123			

Note. *p < .05; **p < .01; ***p < .001

Statistically significant changes were seen for all six dimensions of wellness. According to group means, significant increases were seen in the intervention group.

Analyses to determine within group differences for gender, class, major, and student-athlete status were conducted for the control and intervention groups. The majority of analyses showed no statistical significance between these factors. The only statistical significance (.026, $p<.05$) was in the intervention group for physical health post-test scores (means = 31.40, 28.18) for student-athletes and non-athletes, respectively.

Correlational analyses were conducted to determine the change in reported STEPS in the intervention group. The analyses showed no statistical significant change in reported levels of physical activity using STEPS.

Summary

Following the analyses, there were a number of statistically significant findings for health indicators and perceived wellness dimensions. The strongest significance was found for post-test perceived wellness scores between the control and intervention groups. Chapter Five will further examine the results of the analyses and discuss the rationales. Lastly, the chapter will discuss the contributions of this study to health and wellness research and propose future implications for these findings.

CHAPTER V - DISCUSSION

This study examined the outcomes of a university wellness-based course on health indicators and self-perceived wellness dimensions in the college population. The results of this study provide relevant information for future researchers in the field of health and wellness. Specifically, this study contributes to the literature in the college population that appears to be particularly limited. The following discussion will review the overall results and supporting rationales, limitations to the study, recommendations, and implications for future professionals.

Results and Rationales

In order to test the research hypotheses, pre-test and post-test data were analyzed for physical health indicators and the Perceived Wellness Survey for the control and intervention groups. All seven hypotheses were accepted as true: participants experienced significant health benefits (#1) and participants reported significant increases in physical health, psychological health, emotional health, social health, intellectual health, and spiritual health (#2-7). The interpretations below will further explain the significance found for each variable.

The control group did not receive the 15-week wellness education, which results strongly suggest positively influenced student's physical health indicators and self-perceived dimensions of wellness. Consequently, specific to the health indicators, the control group only showed a statistically significant change ($p<.01$, $t = -2.763$) for diastolic blood pressure (Table 7). Therefore, diastolic blood pressure appeared to increase slightly following the 15-week semester. This may have been due to the overall stress levels seen in students at

the end of the semester; however, this is unlikely due to the lack of significance found in systolic blood pressure, which is accepted as a better indicator for fluctuations in blood pressure due to overall stress and lifestyle (Carroll et al., 2001). It is more likely this change may have been due to the small margin of error of the blood pressure instrument from pre-test to post-test (Ali & Rouse, 2002).

In contrast, there were significant changes seen in body mass index ($p<.01$, $t = -2.2128$) and in resting heart rate ($p<.001$, $t = 3.3135$) for the intervention group (Table 9). Body mass index is a valid tool for the general population but tends to overestimate values for those individuals with a low level of fat mass, such as athletes (Powers & Dodd, 2008). Due to the fact that 65.2% of the intervention group reported being a student-athlete, it is possible the increase in body mass index was due to increases in fat free mass (muscle mass). The lack of significant findings in changes in body composition in the intervention group further support this rationale for body mass index. Therefore, the increase in body mass index may indicate that those students receiving the intervention may have been participating in strength training activities due to sport participation.

To further investigate within group changes over time, a one group repeated measures ANOVA was conducted for all physical health indicators for the control and intervention group. Body mass index, diastolic blood pressure, and body composition showed significant changes ($p<.01$) in post-test scores (Table 11). However, these changes were small and may have been due to the

margin of error of the instrumentation and practitioner during the pre-test and post-test data collection. Overall, it seems the intervention did not have a major impact on health indicators; however, this may have been due to the fitness level of the sample. Research supports that those individuals at a moderate to high fitness level will have small, incremental changes during a 15-week program, compared to untrained individuals receiving education on physical health (Dodd & Powers, 2008). Furthermore, the sample consisted of young adults (18-26 years old) with an average body composition of 15.96 – 19.00, which represents a fit population (Powers & Dodd, 2008). Based on this data, the sample students were most likely already engaging in moderate to vigorous activity on most days of the week, therefore decreasing the chance of having significant changes over time.

While the health indicators did not have many significant changes for the intervention group, the Perceived Wellness Survey data appears to provide promising information in the support of campus wellness-based courses. Both the control and intervention groups had significant increases in self-reported wellness scores following the 15-week semester. The control group had statistically significant ($p<.01$) increases in psychological wellness and social wellness. Additionally, the control group showed the most growth ($p<.001$) for intellectual health (Table 13). Due to the fact that the control group was comprised of physical education, exercise science, and athletic training students, it is possible these students have a background in health and wellness. The control group also consisted of two sections of PE 320 Psychological and

Sociological Aspects of Physical Education. Therefore, the education received in these courses most likely had a positive impact on the psychological, social, and intellectual health of these students, supporting the findings in the control group.

Most interesting and supportive of prior research is the perceived wellness data for the intervention group. For all six dimensions of wellness (physical, psychological, emotional, intellectual, social, and spiritual health) statistically significant ($p<.001$) increases in self-perceived wellness scores were reported by students (Table 15). These data provide strong evidence for the effectiveness of wellness education on self-perceived wellness in college students. When further analyses to investigate change over time was conducted, significant changes ($p<.01$, $p<.001$) were also found for all six dimensions of wellness. The most significant ($p<.001$) differences in self-perceived wellness scores were seen for psychological health, emotional health, physical health, and spiritual health. This is not surprising due to the fact that these particular dimensions of wellness are a primary focus of the wellness-based course afforded to the intervention group.

When examining between group differences for the perceived wellness scores, it is important to note the strong significant findings for the intervention group despite the overall wellness composite scores found in the control group. Participants in the control group had mean composite scores of 25.03 – 27.76, out of a total possible score of 36, which represents a reported overall healthy well-being (Table 16). Despite this occurrence, the wellness education provided to the

intervention group still showed highly significant increases ($p<.01$, $p<.001$) in reported levels of perceived wellness (Table 17). This phenomenon makes a powerful statement about the potential positive influences wellness education may have for the college population on the six dimensions of wellness.

The wellness-based course incorporated an online physical activity tracker STEPS into the 15-week course. Participants in the intervention group logged daily physical activity by entering total minutes of moderate and/or vigorous activity each week. During the data analysis, correlational analyses were run to compare the STEPS physical activity change score with the health indicators and perceived wellness data. The analyses showed no statistical significance for the STEPS physical activity data. While research has found that web-based physical activity tracking can improve reported levels of exercise, the STEPS data did not reflect a change in physical activity levels in the intervention group (Suminski & Petosa, 2006).

There are two proposed reasons for the lack of significance found in the STEP data for this study. First of all, online tracking programs appear to improve levels of moderate, low-intensity exercise, most often walking, in sedentary to low fitness level individuals (Queensland Health, 2008). However, the same research does not necessarily support that those individuals already engaging in regular moderate to vigorous exercise are more likely to increase levels of activity. Due to the fact that 68% of the subjects reported being student-athletes, it is likely that these students already engage in high levels of physical activity, therefore hindering the ability of significant increases from the

STEPS program. Additionally, students may have seen the additional work necessary to log daily physical activity as negative, which may have influenced physical activity behaviors and accurate logging in the program. Overall, when examining the results of this study, all hypotheses were supported, and the strongest significant findings were for self-reported levels of wellness.

Limitations of the Study

While the study provided a sound quantitative, quasi-experimental design, as with any research there were limitations to the study that should be addressed. First of all, the Hawthorne Effect is a well-accepted limitation in any research comprised of a non-random convenience sample where the researcher uses intact groups to form control and intervention groups (Fraenkely, & Wallen, 2007). The Hawthorne Effect states the intervention group may perform better because of the novelty of being involved in the treatment group and their attitudes towards participation in the intervention group as opposed to the control group. However, due to the nature of the intervention being a standard wellness-based course, students most likely viewed the course expectations and obligations the same as other courses, therefore minimizing this threat.

Secondly, the primary investigator delivered the health and wellness education to the intervention group. Therefore, this could potentially lead to bias towards the outcome, due to knowledge of the hypotheses and/or expected outcomes. However, all data were collected using a unique identifier and the pre-test and post-test data were not collected on the same collection sheet. Therefore, Health and Fitness Sciences faculty members, including the primary investigator, did not know the pre-test data during the post-test data collection in week 15. Lastly, with any

study having a control and intervention group that is not a blind study, there is a testing threat. This threat states students may have an alertness towards what is being studied after the pre-test data collection and, therefore, be more alert to what material is important and what to improve upon prior to the post-test data collection. However, this is most likely a minimal limitation due to the significance found in the analyses of between group data.

The Perceived Wellness Survey is a valid tool to evaluate perceptions of wellness; however, the WEL Inventory and the NHANES data could be further included in future studies to collect data on the effectiveness of wellness education in a college sample. In the current study, the sampled college students were comprised predominantly of Health and Fitness Science students majoring in Athletic Training, Exercise Science, and Physical Education. Additionally, the majority of students reported participation in sports. Due to the nature of this particular population, students tended to be more physically active than the general population and regularly engaged in on-campus sport participation. Prospective studies could use students majoring in non-health related majors and non-athletes to evaluate the outcomes of wellness education on the dimensions of wellness. A study population that was more representative of national averages, such as NHANES, would have allowed the primary investigator to make comparisons to national data and further generalize to the college population. Overall, the above limitations of the study were minimized by the study design and data collection procedures. Future research should consider these limitations when conducting wellness research in the college population.

Recommendations and Implications for the Future

The health of the nation continues to be a focus of health professionals and educators as physical activity levels are declining in young adults and adolescents. Therefore, research to establish the effectiveness of wellness education in the college population as a means to improve physical activity and overall lifestyle behaviors is imperative. Research supports that wellness-based courses in first-year freshmen provide a foundation for healthy behaviors, including physical activity, nutrition, stress management, and social interaction (Lafountaine et al., 2006). The intent of this study was to further investigate the outcomes of a wellness-based course on self-perceived wellness perceptions in the college population.

The results provide valuable information to college campuses in regards to the structure and implementation of wellness education for holistic learning and success. Specifically, the strong significant increase in self-perceived wellness scores should be of particular interest to those campuses considering the addition of wellness credits as part of the general education curriculum. As high school students transition into the college environment, students must balance the demands of rigorous academics, extracurricular activities, and social life, all of which contribute to increased stress levels (Kim & Seidlitz, 2002; Thome & Espelage, 2004). A study by Lafountaine et al., 2006, measured stress levels in college students using the WEL inventory. Stress management scores were low as students reported struggling with recognizing causes of stress and positively coping with stress in ways in which they traditionally coped, for example, speaking with family and familiar friends (Lafountaine et al., 2006). Following a holistic model for learning, a wellness-based course could have a positive

influence on the development of stress management skills, therefore reducing the likelihood of academic struggles from the transition to college. Furthermore, in the results of this dissertation study, students reported increases in self-perceived levels of psychological, emotional, and social health, all of which are strongly associated with the ability to manage stress. Therefore, requiring all incoming freshman or first-year students to take a wellness-based course could have a major influence on the academic success and future lifestyle behaviors of those students.

Over recent years, many colleges have implemented first-year college transition programs for incoming freshman and transfer students with minimum college credit. These transition programs teach students life skills required for successful college experiences, such as time management, stress management, access to campus resources, and involvement in campus activities. Some of these transition programs have objectives that include wellness concepts; however, the information is limited in depth and not necessarily taught by an instructor with a background and education in health and wellness. Therefore, transition programs may provide an avenue for introductory information in wellness; however, the implementation of wellness-based education as part of the general education curriculum should be considered by administrators. As evidenced in this study, wellness-based education has a significant impact on student's perceptions of the six dimensions of wellness. This increased perception of wellness could have a valuable impact on the future decisions and success of students during their college experience.

In regards to spiritual health, this study found significant increases in perceptions of spiritual health following the wellness-based education. Spiritual wellness has been viewed as the primary characteristic of healthy individuals, providing the foundation for all other dimensions of wellness (Myers et al., 2000). The implications of these findings for the college population may suggest programs and education should consist of a spiritual component. Furthermore, research continues to support the importance of many dimensions of wellness, including spiritual, as part of a holistic approach to student health and well-being (Adams et al., 2000; Myers et al., 2000).

The strong significant findings for perceptions of wellness are consistent with a similar study by Adams et al. (2000) who examined the relationship between spiritual wellness, psychological wellness, and overall wellness in the college population. The researchers used the Life Purpose Scale and the Perceived Wellness Survey found the effects of life purpose on perceived wellness in college students was mediated by psychological constructs (Adams et al., 2000). Thus, the Adams et al. (2000) study may provide evidence that as perceptions of spiritual wellness improve, so do other areas of wellness. However, most college campuses do not have well-developed wellness programs that span beyond physical health and encompass a holistic approach. Educators and health professionals are urged to consider the holistic model when designing, implementing, and evaluating health promotion programs and campus health initiatives.

A number of individuals consider physical health to be an important component of wellness due to the health benefits of regular physical activity and a healthy diet. College campuses usually offer a variety of ways for students to engage in physical activity, such as campus fitness facilities, intramurals, and sport participation. The results of this study showed significant increases in perceptions of physical health as well as some significance for health indicators (body mass index and resting heart rate) in the students receiving the wellness education. Interestingly, exercise is a well accepted method to relieve stress and anxiety in addition to the health benefits (Powers & Dodd, 2008). Further, as evidenced in research, when improving one dimension of wellness, often other dimensions are influenced because of the constant overlap seen in a holistic wellness model (Adams et al., 2000). Therefore, future research should evaluate the involvement of physical health activities as an avenue to improve other areas of wellness in the college population.

In 2006, Wei et al. (2006) found walking, water aerobics, and yoga reduced anxiety significantly in the college population. Additionally, mood levels were improved in students during bouts of regular walking (Wei et al., 2006). The study by Wei et al. posed an interesting question regarding the relationship between regular physical activity and the dimensions of wellness. In this dissertation study, the intervention group logged daily physical activity. While there were no significant increases in physical activity, the intervention group remained active (average steps an estimated 9,400 per day) during the length of the study. It may be possible that the involvement in physical activity had a

positive influence on significant improvements in the perceptions of wellness. Therefore, college campuses should consider the impact a structured physical activity program could have on improving other areas of wellness in students. One such avenue for this program could be through the offering of structured group exercise courses such as Pilates, yoga, kickboxing, strength training, etc. These safe and effective courses offer students the opportunity to be physically active, while providing a positive environment to improve mental and social health.

In conclusion, this dissertation study provides valuable research to the field of health and wellness in the college population. It seems very evident that wellness-based education should be considered as part of the general education requirements for college students. These courses provide an avenue for young adults to be physically active and develop lifelong behaviors for an active lifestyle. Wellness-based courses encompass all dimensions of wellness: physical, psychological, emotional, intellectual, social, and spiritual that provides a foundation for a holistic lifestyle (Adams et al., 2000; Myers et al., 2007). In order to foster the development of students, administrators and health professionals are encouraged to consider the immense positive impact wellness education may have on the academic success and overall well-being of college students.

REFERENCE LIST

Adams, T., Bezner, J., Drabbs, M, Zambarano, R., & Steinhardt, M. (2000). Conceptualization and measurement of spiritual and psychological dimensions of wellness in a college population. *Journal of the American College of Health, 48*, 165-173.

Adams, T., Bezner, J., Garner, L., & Woodruff, S. (1998). Construct validation of the perceived wellness survey. *American Journal of Health Studies, 14*(4), 212-219.

Adams, T., Bezner, J., & Steinhardt, M. (1997). The conceptualization and measurement of wellness: Integrating balance across and within dimensions. *American Journal of Health Promotion, 11*(3), 208-218.

Alaimo, K., Olson, C., & Frongillo, E. (2001). Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics, 108*, 44-53.

Ali, S. & Rouse, A. (2002). Practice audits: Reliability of sphygmomanometers and blood pressure recording bias. *Journal of Human Hypertension, 16*(5), 359-361.

American College Health Association. (2004). *Standards of practice for health promotion in higher education.* Baltimore, MD: American College Health Task Force on Health Promotion in Higher Education.

American College Health Association. (2007). *Healthy campus 2010.* Retrieved October 1, 2008 from http://www.acha.org/info_resources/hc2010.cfm

American Diabetes Association. (n.d.). *All about diabetes.* Retrieved July 1, 2008, from http://www.diabetes.org/about-diabetes.jsp

American Obesity Association. (2008). *Childhood overweight.* Retrieved October 15, 2008 from http://www.obesity.org/information/childhood_overweight.asp

Anderson, P., Butcher, K., Levine, P. (2003). Maternal employment and overweight children. *Journal of Health Economy, 22*(3), 477-504.

Armitage, C., Sheeran, P., Mark, A., & Madelynne, A. (2004). Stages of change or changes of stage? Predicting transitions in transtheoretical model stages in relation to health food choice. *Journal of Consultation of Clinical Psychology, 72,* 491-499.

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

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

Barlow, S., & Dietz, W. (2002). Management of child and adolescent obesity: Summary of recommendations based on reports from pediatricians, pediatric nurse practitioners, and registered dietitians. *Pediatrics, 110,* 236-238.

Bosaldua, N., & Chiquete, E. (2008). Common predicators of excessive adiposity in children from a region with high prevalence of overweight. *Annals of Nutrition & Metabolism, 52*(3), 227-232.

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

Brown, J. & Pollitt, E. (1996). Malnutrition, poverty, and intellectual development. *Scientific American, 274,* 38-43.

Buckworth, J., & Nigg, C. (2004). Physical activity, exercise, sedentary behavior in college students. *Journal of the American College of Health, 53,* 28-34.

Calfas, K., (2000). Project GRAD: Two-year outcomes of a randomized controlled physical activity intervention among young adults. *American Journal of Preventive Medicine, 18,* 28-37.

Carroll, D., Smith, G., Shipley, M., Steptoe, A. Brunner, E., & Marmot, M. (2001). Blood pressure reactions to acute psychological stress and future blood pressure status: A 10-year follow-up of men in the Whitehall II Study. *Psychosomatic Medicine, 63,* 737-743.

Cawley, J., Meyerhoefer, C., & Newhouse, D. (2006). Not your father's PE: Obesity, exercise, and the role of schools. *Education Next. 6*(4), 60-65.

Centers for Disease Control and Prevention. (2004). Trends in the intake of energy and macronutrients. United States, 1971-2000. *Morb Mortal Weekly Report, 53*(4), 80-82.

Centers for Disease Control and Prevention. (2006). *Healthy youth: School health policies and programs study.* Retrieved July, 1, 2008 from http://www.cdc.gov/HealthyYouth/shpps/index.htm

Centers for Disease Control and Prevention. (2007a). *Overweight and obesity: Economic consequences.* Retrieved October 12, 2008 from http://www.cdc.gov/nccdphp/dnpa/obesity/economic_consequences.htm

Centers for Disease Control and Prevention. (2007b). *Physical activity.* Retrieved July 1, 2008, from http://www.cdc.gov/nccdphp/dnpa/physical/index.htm

Centers for Disease Control and Prevention. (2007b). *Trends in the prevalence of physical activity*. Retrieved October 1, 2008 from http://www.cdc.gov/HealthyYouth/yrbs/pdf/yrbs07_us_physical_activity_trend.pdf

Churchill, G. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research, 16*, 64-73.

Clements, R. (Ed.) (2000). *Elementary school recess: Selected readings, games, and activities for teachers and parents.* Boston: American Press.

Clemens, D., Engler, A., & Chinn, P. (2004). Learning and living health: College student's experiences with an introductory health course. *Journal of Nursing Education, 43*, 313-318.

Coelho, J. (2000). Student perceptions of physical education in a mandatory college program. *Journal of Teaching in Physical Education, 19*, 222-245.

Cook, T., & Campbell, D. (1979). *Quasi-experimentation: Design analysis issues for field settings.* Chicago, IL: Rand McNally.

Council on Physical Education for Children (2001). *Recess for elementary school students.* Position paper for National Association for Sport and Physical Education. Reston, VA.

Cutler, D., Glaeser, E., & Shapiro, J. (2003). Why have Americans become more obese? *Journal of Economic Perspective, 17*(3), 93-118.

Dietz, W. (1999). How to tackle the problem early. The role of education in prevention of obesity. *International Journal of Obesity and Related Metabolic Disorders,* Supplement, 4, S7-9.

Duncan, G., Li, S., & Zhou, X. (2004). Prevalence and trends of a metabolic syndrome phenotype among U.S. adolescents 1999-2000. *Diabetes Care,* 27, 2438-2443.

Economic Planning and Advisory Council. (2004). *Economic report of the president.* Washington, DC: U.S. Government Print Office.

Epstein, L., & Roemmich, J. (2001). Reducing sedentary behavior: role in modifying physical activity. *Exercise and Sport Sciences Reviews, 22,* 269-275.

Evaluation Panel on the Identification, Evaluation, and Treatment of Overweight Adults. (1998). Clinical guidelines of the identification, evaluation, and treatment of overweight and obesity in adults. *American Journal of Clinical Nutrition, 68,* 899-917.

Finkelstein, E., Fiebelkorn, I., & Wang, G. (2003). National medical spending attributable to overweight and obesity: How much, and who's paying? *Health Affairs Supplement,*(3), 219-226.

Finkelstein, E., Rhum, C., & Kosa, K. (2005). Economic costs and consequences of obesity. *Annual Review of Public Health*, 26, 239-257.

Ford, E., Giles, W., & Dietz, W. (2002). Prevalence of the metabolic syndrome among US adults: Findings from the third national health and nutrition examination survey. *Journal of the American Medical Association*, 287, 356-359.

Fraenkely, J., & Wallen, N. (2007). *How to design and evaluate research in education* (6th ed). New York: McGraw Hill.

Freeman, W. (2001). What are physical education, sport, and kinesiology? *Physical Education and Sport in a Changing Society, 1*, 9-14.

French, S., Story, M., & Jeffrey, R. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health, 22*, 309-335.

Gieck, D., & Olsen, M. (2007). Holistic wellness as a means to developing a lifestyle approach to health behavior among college students. *Journal of American College of Health, 56*, 29-35.

Grubbs, L. & Carter, J. (2002) The relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates. *Journal of Family & Community Health, 25*(2): 66-84.

Hafen, Q, Frandsen, K, Karren, J., & Hooker, R. (1992). *The health effects of attitudes, emotional relationships*. Provo, UT: EMS Associates.

Hawks, Sr., Hull, M., Thalman, R., & Richens, P. (1995). Review of spiritual health: Definition, role, and intervention strategies in health promotion. *American Journal of Health Promotion, 9*, 371-378.

Hebebrand, H., Sommerlad, C., Geller, F., Görg, T., & Hinney, A. (2001). The genetics of obesity: Practical implications. *International Journal of Obesity and Related Metabolic Disorders, 25*(1), 10-18.

Hermon, D., & Davis, G. (2004). College student wellness: A comparison between traditional and nontraditional-age students. *Journal of College Counseling, 7*, 32-39.

Hermon, D., & Hazler, R. (1999). Adherence to a wellness model and perceptions of psychological well-being. *Journal of Counseling and Development, 77*, 339-343.

Hettler, B. (1984). Wellness: Encouraging a lifetime pursuit of excellence. *Health Values, 8*, 13-17.

Horneffer-Ginter, K. (2008). Stages of change and possible selves: 2 tools for promoting college health. *Journal of American College Health, 56*, 351-358.

Hudd, S., Dumlao, J., Erdmann-Sager, D., Murray, D., Phan, E. & Soukas, N. (2000). Stress at college: Effects on health habits, health status and self-esteem. *College Student Journal, 34*(2), 217.

Hybertson, D., Hulme, E., Smith, W., & Holton, M. (1992). Wellness in non-traditional age students. *Journal of College Student Development, 33*, 50-55.

Kasiganesan H., Anand S., Malhotra, Karan P., Rajendra P., Rajesh K., Trilok C., Lajpat R., & Ramesh C. (2004). *The Journal of Alternative and Complementary Medicine, 10*(2), 261-268.

Keating, X. Guan, J., Pinero, J., & Bridges, D. (2005). A meta-analysis of college students' physical activity behaviors. *Journal of American College Health, 54*(2), 116-125.

Kelly, G., Kelly, S., & Vu Tran, Z. (2004). Walking, lipids, and lipoproteins: A meta-analysis of randomized control trials. *Prevention Medicine, 38*, 651-661.

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College of Health, 54*, 87-94.

Kim, Y., & Seidlitz, L. (2002). Spirituality moderates the effect of stress on emotional and physical adjustment. *Personality & Individual Differences, 32*(8), 1377-1391.

Kirk, R. (1982). *Experimental design: Procedures for the behavioral sciences.* Belmont, CA: Wadsworth.

Lafountaine, J., Neisen, M, & Parsons, R. (2006). Wellness factors in first year college students. *American Journal of Health Studies, 21*(4), 214-218.

Lakdawalla, D., & T. Philipson. (2002). *The growth of obesity and technological change: A theoretical and empirical examination.* Cambridge, MA: National Bureau of Economic Research.

Leighton, D., & Swerissen, H. (1995). Correlates of vigorous physical activity in young adults during school transition. *Australian Psychologist, 30*, 113-118.

Lightsey, O. (1996). What leads to wellness? The role of psychological resources and well-being. *The Counseling Psychologist, 24,* 589-735.

Mack, G. Mick, G., & Shaddox, L. (2004). Changes in short-term attitudes toward physical education and exercise of university personal wellness students. *College Student Journal, 38*(5), 587-594.

McCormick, J. (2006). College student perception of wellness concepts. *Physical Educator, Lockwood, Park, 63*(2), 1-26.

Mokdad A., Ford E., Bowman B., Dietz W., Vinicor F., Bales V., & Marks J. (2001). Prevalence of obesity, diabetes, and obesity-related health risk factors. *Journal of the American Medical Association, 289*(1), 76-79.

Murphy, M., Nevill, A., Neville, C., Biddle, S., & Hardman, A. (2002). Accumulating brisk walking for fitness, cardiovascular risk, and psychological health. *Medicine in Science in Sports and Exercise, 34,* 1468-1474.

Myers, J., Luecht, R., & Sweeney, T. (2004). The factor structure of wellness: Reexamining theoretical and empirical models underlying the wellness evaluation of lifestyle (WEL) and the five-factor WEL. *Measurement and Evaluation in Counseling and Development, 35,* 239-250.

Myers, J., & Mobley, K. (2004). Wellness of undergraduates: Comparisons of traditional and nontraditional students. *Journal of College Counseling, 7,* 40-49.

Myers, J., & Sweeney, T. (1999). *The Five Factor Wel.* Greensborro, NC: Authors.

Myers, J., Sweeney, T., & Witmer, J. (2000). The wheel of wellness counseling for wellness: A holistic model for treatment planning. *Journal of Counseling & Development, 78*, 251-266.

National Center for Education Statistics. (2007). Public-use data files and documentation: Foods and physical activity in public schools 2005. Retrieved on October 1, 2008 from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006106

National Institutes of Health. (2007). *Statistics related to overweight and obesity.* Retrieved July 1, 2008, from http://win.niddk.nih.gov/statistics/index.htm#preval

National Institutes of Health. (2003). *Theory at a glance: A guide for health promotion practice* (2nd ed.).

Neumark-Sztainer, D.,- & Story, M. (1997). Psychosocial concerns and health-compromising behaviors among overweight and non-overweight adolescents. *Obesity Research, 5*(3), 237-249.

Nielson, S., & Popkin B. (1998). Patterns and trends in food portion sizes, 1977-1998. *Journal of the American Medical Association, 289*(4), 450-453.

Paffenbarger, R., Hyde, R., Wing, A., & Hsieh, C. (1986). Physical activity, all-cause mortality, and longevity of college alumni. *New England Journal of Medicine, 314*(10), 605-613.

Pollitt, E., Leibel, R., & Greenfield, D. (1991). Brief fasting, stress, and cognition in children. *American Journal of Clinical Nutrition, 34*, 1526-1533.

Powers, S., & Dodd, S. (2008). Total fitness and wellness (5th ed.). San Francisco: Pearson Education.

President's Council on Physical Fitness and Sports. (1999). *Physical activity promotion and school physical education.* Retrieved July, 23, 2008, from http://www.fitness.gov/digest_sep1999.htm

Prochaska, J. (2000). Change at differing stages. In C.R. Snyder & R.E. Ingram (Eds.), *Handbook of psychological change: Psychotherapy processes and practices for the 21st century* (pp. 109-127). New York: John Wiley & Sons.

Putnum, J., Allshouse, J., Kantor, L. (2002). U.S. per capita food supply trends: More calories, refined carbohydrates, and fats. *Food Review, 25*(3), 2-15.

Pyle, S., Sharkey, J., Yetter, G., Felix, E., Furlong, M., & Poston, C. (2006). Fighting an epidemic: The role of schools in reducing childhood obesity. *Psychology in the Schools, 43*(3), 360-376.

Queensland Health. (2008). *10,000 Steps*. Retrieved from http://www.10000steps.org.au/

Reker, G., & Peacock, E. (1981). The life attitude profile (LAP): A multidimensional instrument for assessing attitudes toward life. *Canadian Journal of Behavioral Science, 13*, 264-273.

Ruhm, C. (2003). Maternal employment and adolescent development. *National Bureau of Economic Research.*

Sarkin, J., Johnson, S., Prochaska, J., & Prochaska, J.M. (2001). Applying the transtheoretical model to regular moderate exercise in an overweight

population: Validation so a stages of change measure. *Preventative Medicine, 33,* 462-469.

Seaward, B. (1995). Reflections on human spirituality for the worksite. *American Journal of Health Promotion, 9,* 165-168.

Silver, L. (2005). *No recess for recess.* Retrieved June 1, 2006 from the ADDitude Web site: http://www.additudemag.com/experts.asp?DEPT_NO=303&ARTICLE_NO=15&ARCV=1

Sivik, S., Butts, E., Moore, K., & Hyde, S. (1992). College and university wellness programs: An assessment of current trends. *National Association of Student Personnel Administrators Journal, 29,* 136-142.

Society for Nutrition Education: Weight Realities Division. (2003). Guidelines for childhood obesity prevention programs: Promoting healthy weight in children. *Journal of Nutrition Education and Behavior, 35,* 1-4.

Stelzer, J., Ernest, J., Fenster, M., & Langford, G. (2004). Attitudes toward physical education: A study of high school students from four countries – Austria, Czech Republic, England, and USA. *College Student Journal, 38,* 171-179.

Strauss, R. (1999). Childhood obesity and self-esteem. *Pediatrics, 105*(1), 15-19.

Sullum, J., Clark, M., & King, T. (2000). Predicators of exercise relapse in a college population. *Journal of the American College of Health, 48,* 175-180.

Suminski, R., & Petosa,R. (2006). Web-based instruction for changing social cognitive variables for physical activity. *Journal of American College of Health, 54*(4), 219-225.

Thome, J., & Espelage, D. (2004). Relations among exercise, coping, disordered eating, and psychological health among college students. *Eating Behaviors, 5*, 337-351.

Thompson, D., Edelsberg, J., Kinsey, K.L., & Oster, G. (1998). Estimated economic costs of obesity to U.S. business. *American Journal of Health Promotion, 13*(2), 120-127.

United States Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health* (2nd ed). Washington, DC: Author.

United States Department of Health and Human Services. (2001). *The Surgeon General's call to action to prevent and decrease overweight and obesity.* Rockville: MD: Public Health Service. Office of Surgeon General.

Von Ah, D, Ebert, S., Ngamvitroj, A., Park, N., & Kang, D. (2004). Predicators of health behaviours in college students. *Journal of Advanced Nursing, 48*(5), 463-474.

Wei, B., Kilpatrick, M., Naquin, M., & Cole, D. (2006). Psychological perceptions to walking, water aerobics, and yoga in college students. *American Journal of Health Studies, 21*(3), 142-147.

Wilson, T., & Dunn, E. (2004). Self-knowledge: Its limits, value, and potential for improvement. *Annual Review of Psychology, 55*, 493-518.

Witmer, J., & Sweeney, T. (1992). A holistic model for wellness and prevention over the life span. *Journal of Counseling & Development, 71*, 140-148.

Witmer, J., Sweeney, T., & Myers, J. (1993). *Wellness evaluation of lifestyle.* Unpublished manuscript. Ohio University, Athens.

Wolf, A., & Colditz, G.A. (1998). Current estimates of the economic cost of obesity in the United States. *Obesity Research, 6*(2), 97-106.

World Health Organization (1964). *Basic documents.* Geneva, Switzerland: Author.

World Health Organization. (2006). *Obesity and overweight.* Retrieved July 1, 2008, from http://www.who.int/mediacentre/factsheets/fs311/en/

Zametkin, A., Zoon, C., Klein, H., & Munson, S. (2004). Psychiatric aspects of child and adolescent obesity: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*, 134-150.

APPENDICES

APPENDIX A

08-6IRB
Project Number

LINDENWOOD UNIVERSITY
Institutional Review Board Disposition Report

To: Annie Alameda
CC: Drs. Paul Wright and Susan Isenberg

Ms. Alameda's revised IRB proposal was reviewed and accepted on 8/20/2008. The committee appreciated the significant effort that went into this proposal and we wish Ms. Alameda the best of luck with her data collection.

Sincerely,

Colleen Biri, Psy.D. — 8/20/08
Institutional Review Board Chair — Date

APPENDIX B

Lindenwood University
INFORMED CONSENT

Informed Consent to Participate in a Research Study

Title of Research:

The effect of a 15-week university physical activity intervention program [STEPS] on six areas of wellness: physical, psychological, emotional, intellectual, social, and spiritual.

Name of Principal Investigator/Primary Researcher:

Annie Alameda, Assistant Professor Health & Fitness Sciences

Phone Number of Principal Investigator/Primary Researcher:

Annie Alameda aalameda@lindenwood.edu 636-949-4152

Name and Phone Number of Committee Chair:

Dr. Paul Wright pwright@lindenwood.edu 636-949-4801
Committee Chair

A. PURPOSE AND BACKGROUND

Under the supervision of Dr. Paul Wright, Assistant Professor of Health & Fitness Sciences at Lindenwood University, Annie Alameda a doctoral student is conducting research on the outcomes of university wellness programs.

The purpose of the study is to evaluate health outcomes of a 15-week university physical activity intervention program [STEPS] on six areas of wellness: physical, psychological, emotional, intellectual, social, and spiritual.

B. PROCEDURES

If I agree to participate in this research study, the following will occur:

1. will be asked to complete the pre-screening forms including a PAR-Q, liability waiver,and this informed consent (physician release if necessary based on PAR-Q responses) to evaluate my eligibility for the study. (~ 10 minutes)

2. I will be asked to participate in pre and post assessments (Week 1 and Week 15), including: height, weight, blood pressure, body composition, and resting heart rate. All procedures will be conducted by faculty in the Health & Fitness Sciences Department using standardized, non-invasive procedures. (~10 minutes/session)
3. I will be asked to complete a 36 question Perceived Wellness Survey asking me questions about the six areas of wellness: physical, psychological, emotional, intellectual, social, and spiritual health in my current life. (~15 minutes)

4.If I participate in the STEPS intervention program, I will track my daily physical activity using the on-line 10,000 steps log. (~3 minutes/day)

C. RISKS and VOLUNTARY WITHDRAWAL FROM STUDY

Any risks to the subject are listed below:

1.All subjects will be pre-screened for medical clearance and physical activity readiness before participation in pre and post test assessments and prior to participation in the STEPS program. Therefore, there are no known or anticipated risks to those that participate in the study.

2.I will be asked to participate in pre and post assessments, a wellness survey, and the STEPS online step log if I am in the intervention group. I am free to decline to answer any questions that I do not wish to answer, and/or I may stop my participation in the assessments and/or STEPS program at any time.

D. CONFIDENTIALITY

The records from this study will be kept as confidential as possible. No individual identities will be used in any reports or publications resulting from the study. Each subject will be given a unique identifier that is random and in no way linked to the subject.

All hard copy research information will be kept in locked files at all times. Only the primary investigator will have access to the files. All electronic data will be password protected and available only to the primary investigator and committee chairman. After the study is completed and all data has been transcribed, the data will be held for two years and then destroyed.

D. DIRECT BENEFITS

Subjects may have potential benefits/improvements in basic health factors related to risk for disease, such as weight reduction, decreased blood pressure, improved eating habits, increased daily physical activity, and decreased resting heart rate. Additionally, potential benefits/improvements may be seen in the six areas of wellness: physical, psychological,

emotional, intellectual, social, and spiritual as a result of the subject's participation in the STEPS intervention program.

E. ALTERNATIVES

I am free to choose not to participate in this research study.

F. COSTS

There will be no costs to me as a result of taking part in this research study.

G. COMPENSATION

Students will receive credit for completing the STEPS activity log at the end of the 15 week trial. However, all points will be awarded for turning in the log and will not be based on amount of activity, completeness of the log, or in no way related to the information in the log. Faculty will receive free pedometers from GHP for participation in the STEPS program.

H. QUESTIONS

I have spoken with Annie Alameda and/or Dr. Paul Wright about this study and have had my questions answered. If I have any further questions about the study, I can contact Annie Alameda at aalameda@lindenwood.edu or 636-949-4152.

I. CONSENT

I have been given a copy of this consent form to keep.
PARTICIPATION IN RESEARCH STUDY IS VOLUNTARY. I am free to decline to participate in this research study, or I may withdraw my participation at any point without penalty. My decision whether or not to participate in this research study will have no influence on my present or future status at Lindenwood University.

Signature _____ Date _____
Research Participant

Signature _____ Date _____
Primary Investigator

APPENDIX C

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

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

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

→ **DELAY BECOMING MUCH MORE ACTIVE:**

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Supported by: Health Canada Santé Canada

APPENDIX D

LUIHLC Version 2008

LINDENWOOD UNIVERSITY
RELEASE, PARTICIPANT WAIVER, AND HOLD HARMLESS FORM
ACTIVITY:

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1. In consideration for receiving permission to participate in the above-mentioned activity, (herein referred to as ACTIVITY), which is sanctioned or sponsored by Lindenwood University (herein referred to as SPONSOR), I (PARTICIPANT), hereby **RELEASE, WAIVE, DISCHARGE, AND COVENANT NOT TO SUE, AND AGREE TO HOLD HARMLESS** SPONSOR, Lindenwood University, its Board of Directors, its officers, agents, volunteers, other students, third parties, or employees (collectively referred to as RELEASEES) **FROM ANY AND ALL LIABILITIES, CLAIMS, DEMANDS, OR INJURY, INCLUDING DEATH**, unless specifically exempted herein, that may be sustained by me while participating in such ACTIVITY, travel to and from the activity, or while on the premises owned or leased by RELEASEES, **including injuries sustained as a result of the negligence and FUTURE NEGLIGENCE of RELEASEES.** I am able to participate in this activity and I know of no medical, physical, or mental, reason why I should not participate.

2. I am fully aware that there are inherent risks involved with the ACTIVITY, and I choose to voluntarily participate in said ACTIVITY with full knowledge that said ACTIVITY may be hazardous to me and my property. **I VOLUNTARILY ASSUME FULL RESPONSIBILITY FOR ANY RISKS OF LOSS, PROPERTY DAMAGE OR PERSONAL INJURY, INCLUDING DEATH,** that may be sustained by me as a result of participating in said ACTIVITY, **including injuries sustained as a result of the negligence or FUTURE NEGLIGENCE of RELEASEES,** unless specifically exempted herein. I further agree to indemnify and hold harmless the RELEASEES for any loss, liability, damage or costs, including court costs and attorney's fees that may occur as a result of my participation in said ACTIVITY, unless specifically exempted herein.

3. I authorize university staff and other medical personnel to take any action deemed necessary in case of emergency medical situations. I understand that RELEASEES may not maintain insurance covering circumstances arising from my participation in this ACTIVITY or any event related to that participation. As such, I am aware that I should review my personal insurance coverage and my personal insurance will be used when appropriate and applicable.

4. It is my express intent that this document shall bind the members of my family and spouse, if I am alive, and my heirs, assigns and personal representatives, if I am deceased.

5. In signing this Release, Waiver, and Hold Harmless, I acknowledge and represent that I have read the foregoing document, acknowledge that I have the right to review it with my own legal counsel, understand it, and sign it voluntarily as my own free act and deed. No oral representations, statements, or inducements apart form the

foregoing agreement that has been reduced to writing have been made. I execute this document for full, adequate and complete consideration fully intending to be bound by the same, now and in the future.

6. All other terms notwithstanding, this document does not release, and expressly excludes from its terms, claims, liabilities, or causes of action which are non-releasable under State or Federal Laws, including, but not limited to, intentional torts, gross recklessness, gross negligence, fraud, or activities involving the public interest, depending on the jurisdiction.

Participant Signature: _____
Printed Name: _____
Address:

_____

Date: _____ **Telephone:** _____

Parent or Legal Guardian Printed Name & Signature (If under Participant is under 18 years old):

_____

APPENDIX E

Perceived Wellness Survey

The following statements are designed to provide information about your wellness perceptions. Please carefully and thoughtfully consider each statement, then select the one response option with which you most agree.

	Very Strongly Disagree					Very Strongly Agree
1. I am always optimistic about my future.	1	2	3	4	5	6
2. There have been times when I felt inferior to most of the people I knew.	1	2	3	4	5	6
3. Members of my family come to me for support.	1	2	3	4	5	6
4. My physical health has restricted me in the past.	1	2	3	4	5	6
5. I believe there is a real purpose for my life.	1	2	3	4	5	6
6. I will always seek out activities that challenge me to think and reason.	1	2	3	4	5	6
7. I rarely count on good things happening to me.	1	2	3	4	5	6
8. In general, I feel confident about my abilities.	1	2	3	4	5	6
9. Sometimes I wonder if my family will really be there for me when I am in need.	1	2	3	4	5	6
10. My body seems to resist physical illness very well.	1	2	3	4	5	6
11. Life does not hold much future promise for me.	1	2	3	4	5	6
12. I avoid activities which require me to concentrate.	1	2	3	4	5	6
13. I always look on the bright side of things.	1	2	3	4	5	6
14. I sometimes think I am a worthless individual.	1	2	3	4	5	6
15. My friends know they can always confide in me and ask me for advice.	1	2	3	4	5	6
16. My physical health is excellent.	1	2	3	4	5	6
17. Sometimes I don't understand what life is all about.	1	2	3	4	5	6
18. Generally, I feel pleased with the amount of intellectual stimulation I receive in my daily life.	1	2	3	4	5	6
19. In the past, I have expected the best.	1	2	3	4	5	6
20. I am uncertain about my ability to do things well in the future.	1	2	3	4	5	6
21. My family has been available to support me in the past.	1	2	3	4	5	6
22. Compared to people I know, my past physical health has been excellent.	1	2	3	4	5	6
23. I feel a sense of mission about my future.	1	2	3	4	5	6
24. The amount of information that I process in a typical day is just about right for me (i.e., not too much and not too little).	1	2	3	4	5	6
25. In the past, I hardly ever expected things to go my way.	1	2	3	4	5	6
26. I will always be secure with who I am.	1	2	3	4	5	6
27. In the past, I have not always had friends with whom I could share my joys and sorrows.	1	2	3	4	5	6
28. I expect to always be physically healthy.	1	2	3	4	5	6
29. I have felt in the past that my life was meaningless.	1	2	3	4	5	6
30. In the past, I have generally found intellectual challenges to be vital to my overall well-being.	1	2	3	4	5	6
31. Things will not work out the way I want them to in the future.	1	2	3	4	5	6
32. In the past, I have felt sure of myself among strangers.	1	2	3	4	5	6
33. My friends will be there for me when I need help.	1	2	3	4	5	6
34. I expect my physical health to get worse.	1	2	3	4	5	6
35. It seems that my life has always had purpose.	1	2	3	4	5	6
36. My life has often seemed void of positive mental stimulation.	1	2	3	4	5	6