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College of Social and Behavioral Sciences

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Abstract

Healthy Lifestyle Practice Among Online Health Psychology Graduate Students

by

Judi E. Elster

MA, California State University, Sacramento, 1974

BA, Sacramento State College, 1969

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

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Abstract

Research focused on health behaviors of online graduate students is sparse. Health psychology graduate training prepares individuals to share health information with others; the information may be more credible if they present a healthy appearance. The present study tested concepts from social cognitive theory (general perceived self-efficacy) and self-determination theory (autonomy, competence, and relatedness basic needs) to determine predictive value for graduate students' engaging in health behaviors. Participants were 121 (29 health psychology group, 92 other programs group) online graduate students who lived in the United States and attended the same online university, recruited from multiple social media sources. The study used a static comparison quasi-experimental design to examine data from an online survey. Data were analyzed using Pearson correlation, chi-square tests for independence, independent samples *t*-tests, ANOVA, MANOVA, and binary logistic regression. The health behaviors did not differ between the two graduate student groups. General perceived self-efficacy, autonomy, relatedness, and competency mean scores did not predict engaging in health behaviors. A significant negative correlation for the total sample was found between autonomy and body mass index. Positive social change may result from research focused on the best means to encourage health psychologists to regularly engage in health behaviors to the extent of Centers for Disease Control and Prevention recommended levels. By internalizing and modeling good health, health psychologists will add credibility to their message and help to mitigate the connection between premature death from chronic disease due to lack of engaging in a voluntary healthy lifestyle.

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Dedication

This is dedicated to all who never lose the yearning and desire to learn, whether it is questioning what is on the other side of the hill? or what is contained in a book, theory, or article. Thank God for the ability and tenacity to learn more and better ways to approach life.

“It is easier to fight for one’s principles than to live up to them.” Alfred Adler

"Live your beliefs and you can turn the world around." Thoreau

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Chapter 1: Introduction to the Study

Introduction

Health and its definition have been the subject of intense research following the 1979 report of the United States Surgeon General. This report described the status of health among Americans. This report started a continuous study of American's health and heralded the change from treatment of disease to prevention of disease. One major area of research has involved examining voluntary behavior choices that contribute to the development of preventable chronic diseases. Many chronic diseases develop as a result of poor behavioral choices that exact a high cost in terms of medical treatment, quality of life, and premature death. This information is important for health care providers, including health psychologists, to increase awareness regarding how some health choices made by individuals can and do contribute to the development of chronic diseases. In the present study, health behavior of online health psychology graduate students at a large online university, was compared with health behavior of online graduate students at the same online university who were enrolled in graduate programs other than health psychology.

The intent of the present static comparison quasi-experimental design study was to examine whether online health psychology graduate students have engaged in behaviors that meet Healthy People 2020 objectives (CDC, 2013) in the same manner or differently than online graduate students enrolled in other programs at a large online university. Generalized perceived self-efficacy, autonomy, relatedness, and competence have been shown to increase engagement in health behaviors (Bandura, 2005c; Ng et al.,

2012). Therefore, the relationship between adopting health behaviors in life and scores from tests of theoretical concepts (generalized perceived self-efficacy, and the basic needs of autonomy, competence, and relatedness) were examined (Bandura, 2005b, 2005c; Deci & Ryan, 2000, p. 231). General perceived self-efficacy is a broad, stable sense of personal competence in response to dealing effectively with a variety of stressful situations (Schwartz, 1994). Perceived self-efficacy is defined as a person's confidence in his or her ability to plan to engage in a specific task, estimate the effort required, surmount any associated barriers, and determine what the outcomes may be. Perceived self-efficacy or ability to control one's environment may differ depending on the specific situation (Bandura, 1977, 1982, 1997). Autonomy refers to a feeling that behavior is innate, volitional, and independently self-determined by the individual's values and interests, while relatedness is a feeling of secure belonging with individuals and communities, and competence refers to a sense of confidence and effectiveness when interacting socially (Deci & Ryan, 2000).

Traditional brick and mortar graduate degree granting institutions have reported that the total number of master's (752,000) and doctoral degrees (175,000) that were conferred in 2012-2013 were respectively 45% and 44% higher than degrees that were conferred in 2002-2003 (National Center for Education Statistics, 2015a). The number of online-only students enrolled at the graduate level in the fall of 2013 for public institutions was 1,281,880, while private nonprofit institutions was 520,390 and private for-profit institutions was 856,933 (National Center for Education Statistics, 2016). The number of graduate degrees that were conferred in health professions and related

programs during the 2012-2013 school year were 90,900 at the master's level and 64,200 at the doctoral level (National Center for Education Statistics, 2015b).

The American Psychological Association (APA; 2014, 2015) described the study and practice of the health psychology graduate student as having a primary focus on what constitutes, promotes, and maintains health (see also, American College Health Association, 2002; Matarazzo, 1980, 1982). This program of study prepares the graduate to enter the professional world whether associated with a medical facility or independently providing assessments and programs with health emphases (APA, 2015).

Health advice presented by physically fit, healthy physicians and healthcare workers has a greater likelihood of acceptance and inclusion in a client or patient's life and therefore may help patients avoid or lessen occurrences of preventable chronic diseases (Meraya, Raval, & Sambamoorthi, 2015; Schoenborn, Stommel, & Ward, 2014). Primary care physicians who are in their normal weight range have been found to be more likely to advise and encourage their overweight patients to diet and exercise (Abramson, Stein, Schaufele, Frates, & Rogan, 2000; Bleich, Bennett, Gudzone, & Cooper, 2012; Lobelo & de Quevedo, 2016; Stanford et al., 2014). Bleich, Gudzone, Bennett, Jarlenski, and Cooper (2013) said that patients do not view an overweight or obese physician as providing credible advice, and as a result, were less likely to follow that advice or place as much trust in the advice. (Frank, Breyan, & Elon, 2000) found the physician's advice and ability to motivate patients to engage in healthy habits were associated with healthy weight of the physician. The credibility of the physician's advice was related to the physician presenting a healthy appearance, i.e., not being overweight.

Physical therapists, physical therapy assistants, and students exceed rates of physical activity among the United States adult population and other healthcare professionals (Chevan & Haskvitz, 2010). The importance of engaging in health behaviors was found to be high among both physical therapists and physical therapy students. Positive role modeling was seen as more important to physical therapist students than to the fully licensed physical therapists to use as a tool to aid in guiding successful health promotion (Black, Marcoux, Stiller, Qu, & Gellish, 2012).

Research has been conducted with clinical/health psychology graduate students although they were not used as test subjects but rather used as trainers, as well as group, session, or intervention leaders (American College Health Association, 2002; Carrico, Antoni, Weaver, Lechner, & Schneiderman, 2005; Daiss, Wayment, & Blackledge, 2013; Shim & Park, 2012; Tanenbaum et al., 2013) No research previously conducted focused on whether clinical/health psychology graduate students engage in behaviors associated with healthful living, and none of it was conducted at online universities. As with physicians, physical therapists, and healthcare workers, health psychologists who have internalized and engage in health behaviors would be expected to be more likely to convey a positive influence to their colleagues, students, and clients when encouraging them to also engage in the best health practices. Advice of health professionals who exhibit health is thought to be emphasized when the health professional also engages in the health behaviors they are advising the patient to use (American College Health Association, 2002; Bleich et al., 2013; Frank et al., 2000; Puhl, Gold, Luedicke, & DePierre, 2013). Health advice from professionals who engage in healthy behaviors will

contribute in the long term to significant reductions of chronic disease and associated healthcare costs (Meraya et al., 2015; Schoenborn, Adams, & Peregoy, 2013).

The theoretical framework for the present study consists of two theories to determine whether perceived self-efficacy from social cognitive theory (Bandura, 1977, 1989b, 1999, 2011), or autonomy, competence, and/or relatedness, from self-determination theory (Deci & Ryan, 1985; Ng et al., 2012; Ryan & Deci, 2000), may have a stronger relationship or predict engaging in health behaviors. Perceived self-efficacy is defined as a judgment of capability (Bandura, 2012, p. 29) and is further described as developed and supported in the environment (Bandura, 1977, 2012) General perceived self-efficacy was examined in this study and is the belief in one's ability to cope with many varied demands (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005, p. 80; Luszczynska, Scholz, & Schwarzer, 2005, p. 439; Schwarzer, Mueller, & Greenglass, 1999, p. 145).

The self-determination theory basic needs of autonomy, competence, and relatedness are defined as originating innately, are universal, and their fulfillment is not primarily dependent on environmental influences for satisfaction (Deci & Ryan, 2002). Autonomy is the belief that behavior originates within and is a product of the individual's values and interests. Competence refers to having a sense of being effective in terms of interacting with the social environment with confidence (Deci & Ryan, 2002). Relatedness refers to the relationship with community and individuals within that community (Deci & Ryan, 2002). The satisfaction of basic needs is required to enable self-generated motivation to remove barriers and provide for general well being.

This chapter provided a description of the background of the present static group comparison quasi-experimental design research. The purpose and statement of the problem to be addressed was presented along with the research questions and hypotheses that were tested. The theoretical framework applicable to this study was followed by definitions of key concepts. The chapter ended with a description of the scope, delimiting factors, and significance of the present research.

Background

The first Surgeon General's Report brought to the public's attention the efforts of various government agencies to reverse trends among Americans involving unhealthy living (United States Surgeon General, 1979). This report began a continuing dialogue between government, academic research, and the residents of the United States and sought to provide remedies to combat the increases in preventable chronic disease. Unhealthy trends were observed in people who voluntarily engaged in behaviors known to contribute to or were associated with preventable chronic diseases. These behaviors include smoking, drinking alcohol to excess, engaging in very little leisure time physical activity, becoming obese, and not obtaining enough sleep on a regular basis (Loef & Walach, 2012; Schoenborn et al., 2013). Relationships between health behavior and the prevention of chronic diseases and the subsequent lowered mortality as measured by statistics related to morbidity and mortality have received intense study to determine the best methods to increase health and reduce anticipated high healthcare costs associated with poor health and chronic disease (Meraya et al., 2015).

The Centers for Disease Control and Prevention (CDC, 2006) described the transition in the medical community as moving the treatment of patients/clients from a primarily symptom relief focus to including preventive measures or a combination of these two approaches.. Along with increased health knowledge regarding the effects of poor behavior choices, information regarding treatments and support has been provided to the public by numerous disease specific organizations such as the American Heart Association. Health behavior objectives encouraged by websites Healthy People 2010 and Healthy People 2020 (CDC, 2013, n. d.) include obtaining sufficient sleep, engaging in moderate to vigorous leisure-time physical activity, maintaining a normal range body mass index (BMI), abstaining from tobacco, and drinking alcohol responsibly.

A gap in the literature exists regarding the health practices of health psychology graduate students and how well they meet Healthy People 2020 objectives. Much student-related data has been obtained from brick and mortar college freshmen or undergraduates and may not easily be generalized to online health psychology graduate students due to differences in terms of age, family structure, employment, and other factors. Just as an out of shape sports trainer may have difficulty coaching clients or retaining them, to the same may be true of health psychologists. Like sports trainers, health psychology graduate students learn the importance of engaging in behaviors that promote health. Research is needed to determine whether online health psychology graduate students are engaging in healthy behaviors, something that may well add credibility to the health message they will bring to the public. It is important to explore who engages in healthy behaviors and whether engaging in them is a result of studies

undertaken in pursuit of advanced education. Increasingly, health psychologists are working with other professionals, physicians, professors, or in private practice (APA, 2015), and are engaged in influencing clients/patients, students, and colleagues about the importance of a healthy lifestyle.

Previous studies have focused on interventions designed to reduce the incidence of harmful health behaviors in undergraduate students. The present study used a static group comparison quasi-experimental design with an online survey completed by University graduate student participants from a large online university. The survey gathered data to compare online health psychology graduate students and students from other programs with the health behavior objectives of Healthy People 2020 (CDC, 2013; Schoenborn et al., 2013). In addition, comparisons of test scores of general perceived self-efficacy (Schwarzer & Jerusalem, 1995), autonomy, relatedness, and competency (Deci & Ryan, 1985; Ng et al., 2012; Ryan & Deci, 2000) assessed the degree to which each theoretical concept was predictive of engagement in maintaining a normal range BMI, obtaining sufficient sleep, engaging in leisure time physical activity (aerobic or muscle strengthening), not smoking tobacco cigarettes, and drinking alcohol responsibly or not at all. Social desirability was tested to determine whether participants were likely to exhibit bias in terms of their self-reported health measures. The Social Desirability Scale-17 (Stöber, 2001) is an updated revision of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). The Social Desirability Scale-17 was used to assess the likelihood of participants responding in a socially desirable manner. Finally, selected demographics (gender, race, marital status, employment, part of United

States where they lived, and whether the participant resided in an urban or rural environment) were compared with health behaviors of health psychology graduate students and graduate students in other programs. The present research provided information regarding whether the study of health psychology at the graduate level increases the likelihood of online health psychology graduate students engaging in behaviors that contribute to their health and meet Healthy People 2020 objectives. The design of this research is more fully described in Chapter 3.

Problem Statement

The problem of interest was derived from the recognition that many chronic diseases are preventable if individuals engage in healthy behavior. Educating the public regarding the importance of healthy behaviors will be one of the major focuses of health psychology doctoral graduates. The current study addressed a gap in the literature regarding the health practices of health psychology graduate students and how well they meet Healthy People 2020 objectives. The study of health practices among health psychology graduate students has been overlooked. Engagement in health behaviors contributes to the prevention of chronic disease, particularly from an early age (Booth, Roberts, & Laye, 2012; McEniry, 2013; Warburton, Nicol, & Bredin, 2006). The present research focused on online graduate student engagement in health behaviors described by CDC guidelines and objectives. Comparisons were made between participant groups (online health psychology graduate students and online graduate students in other programs) as well as objectives put forth by Healthy People 2020. The study of the

health behavior of online health psychology graduate students has not been previously addressed in the literature.

Purpose of the Study

The purpose of this static comparison quasi-experimental design study was to examine health behaviors and identify whether certain theory concepts (generalized self-efficacy, autonomy, competence, relatedness) were associated with engaging in those health behaviors among online health psychology graduate students and compare with data from online graduate students enrolled in other programs. Comparisons between these two groups involve BMI and four specific health-related behaviors: sufficient sleep, physical activity, smoking tobacco cigarettes, and alcohol use as defined by CDC Healthy People 2020 (2013). Healthy People 2020 states guidelines and objectives for these health behaviors and BMI. The present study examined whether test results for generalized perceived self-efficacy (Schwarzer & Jerusalem, 1995), autonomy, relatedness, and competency (Deci & Ryan, 1985; Ng et al., 2012; Ryan & Deci, 2000) are related to meeting CDC objectives for health engagement.

Presenting an image of health along with the message of how health is supported through individual behavioral choices may add credibility to the message delivered by the health psychologist and promote positive behavior. The credibility of health-related messages presented by physicians and other healthcare workers has been shown to influence how well clients or patients receive health-related advice and the likelihood that they will follow those directions (Abramson et al., 2000; Bleich et al., 2012; Bleich et al., 2013; Lobelo & de Quevedo, 2016; Stanford et al., 2014).

The intent of the present static group comparison quasi-experimental design study was to add to knowledge base relating to health psychology graduate students by exploring and reporting whether online graduate students who are studying health psychology differ from online graduate students from other programs in terms of engaging in health behaviors according to the guidelines and objectives of Healthy People 2020. It was expected that a percentage of online graduate students have full-time employment or have family members including small children in the household. Engaging in the specific objectives of Healthy People 2020 may be difficult to fit into an already full lifestyle. For adults over 22 years of age, Healthy People 2020 recommended an average of 7-8 hours of sleep per 24-hour period and engaging in aerobic exercise for 150 or 300 minutes per week, as well as muscle strengthening exercises on at least 2 days per week in addition to doing online research and coursework, commuting to and from work, or meeting job requirements. The current study expands knowledge regarding online health psychology participants versus participants in other programs engaging in health behaviors (i.e., obtaining sufficient sleep, maintaining normal range BMI, engaging in leisure time physical activity, and abstaining from tobacco smoking or alcohol use).

The present survey study is a static group quasi-experimental comparison design (Campbell & Stanley, 1963) and is nonexperimental in that the researcher does not manipulate the independent variables and random assignment to groups is lacking. Campbell and Stanley (1963, p. 12) described the static-group comparison as “a design in which a group which has experienced X is compared with one which has not, for the

purpose of establishing the effect of X” (p. 12). In the present case, participants were online graduate students at a large online university. Online graduate students enrolled in programs other than health psychology at the same large online university provided comparison data. Due to the lack of previous research regarding this population, nondirectional hypotheses were used. The dependent continuous variables of the study were the test scores from the General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995), and the Basic Needs Satisfaction in General scale (Deci & Ryan, 2015; Faye & Sharpe, 2008; Gagné, 2003). The answers to health questions related to sleep, physical activity, alcohol use, and smoking tobacco are dependent categorical variables. BMI is a dependent continuous variable.

Prior to testing the research questions and hypotheses, descriptive statistics were used to examine each participant group. The specific demographic variables examined were gender, age, race, graduate program, marital status, geographic region of the United States, whether they live in a large metropolitan area or small or rural area, and employment status. Other questions were included regarding whether participants have ever held a position in a healthcare field, if they qualified for a disability parking placard, and if they used financial aid to attend school. Descriptive statistics included means and confidence intervals, medians, variance, and standard deviation.

Included among the types of statistics recommended for use with nonexperimental research are the independent-samples *t* test, Mann-Whitney *U* test, and one-way analysis of variance (ANOVA) (Green & Salkind, 2008). However, Tabachnick and Fidell (2014, pp. 34-35) stated that statistical manipulations function in nonexperimental or

survey research quite well with the exception that causality may not be inferred, only relationships. The data from the following research questions were analyzed using appropriate Pearson correlation coefficient analysis, independent samples *t* test, Pearson's Chi-square test, one-way ANOVA, one-way between groups multivariate analysis of variance, and binary logistic regression.

Research Questions and Hypotheses

The present static group comparison quasi-experimental design survey study compared health behaviors of online health psychology graduate students and online graduate students from other programs in terms of sufficient sleep, alcohol drinking, tobacco use, BMI, and leisure time physical activity. A recommended sample size of 300 (150 health psychology graduate students, 150 graduate students from other programs) was obtained by using the online sample size calculator G*Power. This figure was consistent with the assumptions of $\alpha = .05$. 2-tailed test, and power = .95. After approximately 9 months of recruiting, the number of participants was 230. Those who did not complete the survey or had extreme scores were excluded from the study. The sample was reduced to 121 online graduate students enrolled at a large online university who were included in the analysis. Twenty-nine of the graduate students were enrolled in the Health Psychology graduate program and 92 were enrolled in other graduate programs.

The following research questions are also listed in Chapter 3 and Chapter 4. The intent of the research questions was to gain information to describe health practices

among the sample that helps to reduce the gap in literature regarding online health psychology graduate students and whether they meet Healthy People 2020 objectives.

RQ1 Do demographic variables (gender, race, age, marital status, geographical area, place of residence, and employment) explain differences in maintaining normal range BMI or of engagement in health behaviors (sleep, tobacco cigarette use, alcohol use,, and leisure time physical activity of vigorous intensity, light to moderate intensity, and muscle strengthening with weights and/or calisthenics)?

H₀1: There are no significant differences in maintaining a normal range BMI and engagement in health behaviors by demographic characteristics of the sample.

H_a1: There are significant differences in maintaining a normal range BMI and engagement in health behaviors by demographic characteristics of the sample.

RQ2: Is there a difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening with weights and/or calisthenics) as categorized according to CDC recommended guidelines?

H₀2: There is no significant difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors as categorized according to CDC recommended guidelines.

H_{a2}: There is a significant difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors as categorized according to CDC recommended guidelines.

RQ3: Do mean scores from tests of theory concepts of general perceived self-efficacy, autonomy, competence, or relatedness differ between online health psychology graduate students and online graduate students from other programs?

H₀₃: There are no significant differences in mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness between online health psychology graduate students and online graduate students from other programs.

H_{a3}: There are significant differences in mean scores from tests of general perceived self-efficacy, autonomy, relatedness, and competence between online health psychology graduate students and online graduate students from other programs.

RQ4a: Is there a correlation between BMI and the mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness?

H_{04a}: There is no significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

H_{a4a}: There is a significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

RQ4b: How well do the set of predictor variables (mean test scores on general perceived self-efficacy, autonomy, competence, or relatedness) predict engagement in health behaviors to the level categorized according to CDC recommended guidelines?

H₀4b : Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do not predict or explain engagement in health behaviors to the level categorized according to CDC recommended guidelines.

Ha4b: Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do predict or explain engagement in health behaviors to the level categorized according to CDC recommended guidelines.

RQ5: Is there a difference in mean test scores for social desirability bias between students in online health psychology graduate programs and students enrolled in other graduate programs?

H₀5: There is no significant difference in mean test scores for bias between online health psychology graduate students and students enrolled in other graduate programs.

H_a5: There is a significant difference in mean test scores for bias between online health psychology graduate students and students enrolled in other graduate programs.

Theoretical and Conceptual Framework for the Study

The theories that provide the framework for this study are the social behavior theory of Bandura (1977) and the self-determination theory of Deci and Ryan (2000). Specific to social behavior theory, the concept of perceived self-efficacy is defined as a judgment of capability of dealing with both old and new situations (Bandura, 2012, p. 29). Perceived self-efficacy is defined as an acquired behavior originating in and supported by the extrinsic world or the environment (Bandura, 1977, 2012). I examined general perceived self-efficacy a concept defined by Schwarzer and Jerusalem (1995) as an optimistic, stable response that is applied broadly across many domains. In addition to

general perceived self-efficacy, I examined the basic psychological needs of autonomy, competence and relatedness from self-determination theory (Deci & Ryan, 2000). The site of control for the basic psychological needs is described as innate, intrinsic need satisfaction and while the environment may influence the satisfaction of needs, it is not the primary reinforcement of the basic needs (Deci & Ryan, 2000, 2008). Both self-efficacy and basic need fulfillment have been shown to increase healthy lifestyle engagement (Bandura, 2005b; Ng et al., 2012). In addition to BMI, the health behaviors to be examined include sleep, leisure time physical activity, alcohol use, and tobacco cigarette smoking. These health behaviors were identified in the healthy objectives from Healthy People 2020 (see Appendix B; CDC, 2013). Chapter 2 provided more information from the literature about these theories.

Nature of the Study

The present study is a static group comparison quasi-experimental design survey study (Campbell & Stanley, 1963). This design was chosen to describe health behaviors of online health psychology graduate students, a participant group whose health practices have not been studied previously. These students' survey answers were compared with online graduate students from other programs. A survey was used to obtain health information from both groups of students who were enrolled at the same large online university. Online survey questions collected demographic data that was examined to determine if the demographics were related to meeting BMI and health behavior objectives(see list of questions in Appendix A). Participants completed the General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) and Basic Need

Fulfillment in General subscales (Deci & Ryan, 2015). Scores were examined to determine whether the theory concepts of general perceived self-efficacy, autonomy, competence, and relatedness were predictive of or associated with participants' ability to meet or exceed CDC health objectives. The Social Desirability Scale-17R (Stöber, 2001) was also included in the survey as a measure of participant bias.

Further analysis examined whether there was a difference between participant groups (online health psychology and online graduate students from other programs) and meeting the objectives for health behaviors put forth by Healthy People 2020 (CDC, 2013). Independent samples *t* tests were used to determine whether the BMI differed between participant groups and chi-square was used to determine whether the participant groups differed in meeting objectives for the health behaviors. Results obtained from tests of theory concepts of generalized self-efficacy, autonomy, relatedness, and competency were analyzed using binary logistic regression to determine if the theory concepts were predictive of meeting health behavior objectives. A complete description of the statistical analyses are presented in Chapters 3 and Chapter 4. A description of the nature of this study is presented in Chapter 3.

Definitions

Alcohol use: Healthy People 2020 (2013) defined recommended usage as follows: moderate alcohol consumption of one drink per day for females, up to two drinks per day for males, avoidance of heavy drinking (for men this would be consuming 15 or more drinks per week, and for women eight or more drinks per week), and

avoidance of binge drinking (for men this is five or more drinks on a single occasion and for women, four or more drinks on a single occasion, usually within a 2-hour period).

Body Mass Index (BMI): BMI is obtained from dividing weight in pounds by height in inches times itself or squared (CDC, 2015). BMI includes four categories which are: not overweight (index of 24.9 or less), underweight (index less than 18.5), healthy weight (index between 18.5 and 24.9), and overweight (index greater than 25). The overweight category includes subcategories of overweight but not obese (index between 25 and 29.9) and obese (index greater than 30). These categories were used in this study.

Cigarette Smoking: Cigarette smoking questions in this study were modified from questions used in the 2008-2010 National Health Interview Survey that were analyzed and reported by Schoenborn et al. (2013). The questions used in this study were designed to examine smoking behavior and included whether participants currently smoked, had quit smoking or had ever smoked.

Education level: In this study, education level refers to whether a participant is enrolled in a master's or doctoral health psychology or other graduate level program at a large online university. Education level also refers to demographics of participants in this study regarding whether they had obtained a bachelor of arts or sciences, a master of arts or sciences, a doctoral or medical degree, or multiple degrees.

Leisure time physical activity: Physical activity which takes place during leisure time and may be either aerobic or muscle strengthening (Centers for Disease Control and Prevention (n. d.). Objectives and guidelines recommend adults engage in at least 2 days

per week of muscle strengthening to engage all muscle groups and at least 150 minutes per week of moderate aerobic activity. Aerobic activity categories are inactive, low activity, medium activity, and vigorous activity. Applicable duration for each aerobic activity level is between 75 minutes per week for vigorous intensity activity, 300 minutes per week for low intensity activity, between 150 and 300 minutes per week for moderate intensity activity. The muscle strengthening portion of leisure time physical activity refers to time spent performing exercises or weightlifting on at least two days a week.

Place of residence: Three population levels used by Schoenborn et al. (2013) to refer to the area in which people live were developed by the United States Census Bureau (2009). The three population levels are: a large metropolitan statistical area containing 1,000,000 or more people, a small metropolitan statistical area containing at least one area with 50,000, but fewer than 1,000,000 people, or, not in a metropolitan statistical area and containing less than 50,000 people in any area within it. These areas are formed based solely on the population, although they may include one or more cities or towns. In this research, the population levels were condensed to two areas: a large or medium urban area over 100,000 people and a small urban or rural area.

Sufficient Sleep: The objective for sufficient sleep was to obtain an average of between seven and eight hours of sleep within a 24 hour period for adults aged over 22 years (CDC, 2013).

Assumptions

Assumptions associated with this static comparison quasi-experimental design research study include that participants were willing and able to respond honestly and

completely to questions, were able to understand online survey instructions and questions, and were willing to provide responses to all survey questions. It was assumed that the participants would have and be able to use a computer as they were online students. These assumptions are based on the premises that the study would be conducted entirely on the internet and participants would have access to the survey only one time.

Scope and Delimitations

The scope of this static group comparison quasi-experimental design research study relates to how well online health psychology graduate students exhibit and self-report health behaviors that they have studied in their graduate academic program. Furthermore, online health psychology graduate students were compared with online graduate students from other programs to see if they differ in terms of engagement in health behaviors. A gap is in the literature regarding the health practices of online health psychology graduate students and how well they meet Healthy People 2020 objectives.

Similar to other health professionals, online health psychology graduate students engage in health behaviors and may also gain credibility if they present a healthy appearance consistent with the advice being given (Black et al., 2012; Bleich et al., 2013; Chevan & Haskvitz, 2010; Frank et al., 2000; Helfand & Mukamal, 2013; Lobelo, Duperly, & Frank, 2009; Oberg & Frank, 2009; Puhl et al., 2013). Graduate students enrolled in the online health psychology graduate degree program and an equal number of online graduate students who are enrolled in programs other than health psychology at a large online university completed an online survey related to health behaviors,

demographics, social desirability, generalized perceived self-efficacy, autonomy, competence, and relatedness. The participants responded to recruitment ads posted in social media sites such as ResearchGate, LinkedIn, and Lee Stadtlander's blog. Recruitment continued for a period of nine months at which time there appeared to be close to 230 participants; however, after the data were cleaned of extreme cases and incomplete surveys, the number of participants became 121. In addition to the posted recruitment ads, the large online University Participant Pool was used. Using these methods to attract participants provided a larger sample than one method alone and provided a convenience sample of the population at the large online university. The participants were assumed to have a computer or access to one since they were enrolled in an online graduate degree program. Potential participants were limited to students in a graduate program at one large online university, who live in the United States, and were 18 years of age or older. Those students who are not in a graduate program, are not living in the United States, or are less than 18 years of age were excluded from the present study.

Limitations

One limitation of the present static group comparison quasi-experimental design study was that the population sample was from one online university. This reduced the ability to generalize results to students attending other institutions. The nature of self-reported answers to survey questions has been discussed extensively in the literature with little resolution to the questions of the validity or bias associated with the responses, or what other means are available to obtain answers at a distance that are economically

feasible (Girschik, Fritschi, Heyworth, & Waters, 2012; Lauderdale, Knutson, Yan, Liu, & Rathouz, 2008; Racette et al., 2014; Short, Gradisar, Lack, Wright, & Carskadon, 2012). The potential for misrepresentation of performance (i.e., social desirability is known to be associated with poor health practices such as obesity, lack of exercise, engaging in cigarette smoking, and excessive drinking. This misrepresentation may be more likely to occur among samples of participants who are studying the subject matter and thus familiar with what are preferred health behaviors. The Social Desirability Scale-17R (Stöber, 2001), a 16 item forced choice scale, was included in the survey as a measure of this potential for misrepresentation or bias. Further information regarding this instrument was provided in Chapter 3.

It is unknown how many graduate students are registered in the voluntary large online university Participant Pool. The large online university Participant Pool provides an online bulletin board that is available to students who are enrolled at the University and are registered with the Participant Pool. The registered students were notified by email of the existence of this research that was looking for participants. A brief research outline was posted along with a description of criteria for participation.

The comparison between health psychology online graduate student responses and online graduate students in other programs at this large online university is a limitation due to only sampling graduate students at one school. The online health psychology graduate students in the present study have pursued the higher education study of health while the knowledge of health information among the comparison group of graduate students in other programs is unknown and may or may not be similar to that

obtained on a health related degree path. Some of the participants in the present study may have multiple degrees; the effect this may have on data gathered is unknown. This sample is termed a convenience sample due to the specific population and the use of volunteers as participants (Creswell, 2014).

Potential confounding variables are likely to be present, particularly with reference to intertwined health behaviors and their effects on one another. This study focused on an area not previously studied and was designed to explore the health behavior of online health psychology graduate students. The information gathered examines the association of theory concepts with engaging in health behaviors.

Significance

This study examined the inclusion of certain health behaviors in the lives of online health psychology graduate students. Engaging voluntarily in healthy behaviors is thought to provide individuals with a better chance of living through middle to old age with continued good health and avoiding the possibility of developing chronic diseases (CDC, 2013). Thus, the individual is partially responsible for future health due to current behavioral choices. Health psychologists influence the knowledge base through research, counseling, and teaching. This information increases the public awareness of the connection between ill health and its prevention. High costs associated with preventable diseases includes costs of health care, lost productivity, and early mortality. Chronic diseases, and premature deaths consume large portions of the medical care budget. One potential contribution of this study is to provide information to address a gap in the literature relating to whether online health psychology graduate students practice health

principles and behaviors. The results of this study may indicate whether health psychology graduate students will have the ability to convey the importance of maintaining a health-focused lifestyle to the public both through verbal and physical means.

The present research was a static group comparison quasi-experimental design in the form of a survey that also examined the question of whether general perceived self-efficacy (Bandura, 1977, 1989b, 1999, 2011; Schwarzer & Jerusalem, 1995), and basic needs of autonomy, relatedness, and competency (Deci & Ryan, 1985; Ng et al., 2012; Ryan & Deci, 2000) are predictors of the likelihood of engaging in healthy lifestyle behaviors. This will potentially provide tools that can be effectively used by health psychologists or other health practitioners to support healthy behaviors that positively influence health and decrease chronic illness.

Positive social change may result from research focused on the best measures to support and encourage health psychologists to internalize and regularly engage in health behaviors to the extent recommended by CDC for substantial health benefits. The present research was a first step in exploring how much and what forms of health behavior are included in the lives of online health psychology graduate students. The results may be useful to online schools in determining whether a need exists to support and encourage the appearance representing engagement in a health-filled lifestyle.

Summary

The present research was a static group comparison quasi-experimental design (Campbell & Stanley, 1963). This design was chosen to provide descriptive information

relating to the health behaviors of the subject group, which has not been studied previously. This research was intended to provide insight into whether online health psychology graduate students adhere to health behaviors to a greater degree than the general online graduate student population. Specific behaviors examined were identified from among the objectives put forth by Healthy People 2020. BMI was included with health behaviors that were sleep, leisure time physical activity, alcohol use, and cigarette smoking. The theoretical frameworks for this study were social cognitive theory (Bandura, 1977, 1989b, 1999, 2011) and self-determination theory (Deci & Ryan, 1985; Deci & Ryan, 2000; Ng et al., 2012). The concepts examined to determine if they were related to or predictive of health behavior were general perceived self-efficacy, autonomy, relatedness, and competence. Very little research has examined the degree to which online health psychology graduate students live a health-focused lifestyle. Such a lifestyle is important for these professionals as it lends credibility to the messages they give to their clients and will encourage better health, reduce the incidence of preventable chronic disease as well as ultimately to lower treatment costs associated with preventable chronic diseases.

Chapter 2 provides a review of the literature relating to the health behaviors examined as well as major theories that form the framework for this study. Chapter 3 includes a description of the procedure and methodology. Enough detail was provided to allow other researchers to replicate this research.

Chapter 2: Literature Review

Introduction

The purpose of the present static group comparison quasi-experimental design study was to examine health behaviors and identify theory concepts that may be predictive of engaging in those health behaviors among online health psychology graduate students and compare their health behaviors to health behaviors of online graduate students from other programs. The health behaviors studied are maintaining a normal range BMI, obtaining sufficient sleep, engaging in leisure time physical activity, not smoking tobacco cigarettes, and drinking alcohol responsibly or not at all, as defined by Healthy People 2020 objectives. The 2016-2017 large online university's catalog describes training in the health psychology curriculum for all health behavior areas examined in the present research. Courses such as Stress and Coping are taught in the first year of both master's and doctoral programs and explicitly discuss the issues addressed in the current study.

Accredited graduate degree programs have witnessed the expansion of enrollments in traditional and online colleges and universities to more than a million students (Allen & Seaman, 2008, 2010; Howland, 2013). The growth in graduate program enrollment involves evaluating students' ability to demonstrate their knowledge of subjects. Research concerning engagement in health behaviors for health psychology and behavioral health graduate students has been described by Valentine and Bennett (2013) as not keeping pace with the expansion of enrollments in these disciplines .

Little research has examined health behaviors and lifestyle behaviors expressed by students in online graduate degree programs. Inadequacy in modeling these health behaviors by health care professionals was found to interrupt the positive practitioner-client relationship as it relates to trust and the likelihood of patients following advice. Research has examined the occurrence of patient trust and following advice from medical doctors and physical therapists (Black et al., 2012; Bleich et al., 2013; Chevan & Haskvitz, 2010; Frank et al., 2000; Helfand & Mukamal, 2013; Lobelo et al., 2009; Oberg & Frank, 2009; Puhl et al., 2013). Bleich et al. (2013) found patient trust of physician's advice was greater when the physician was of normal weight range. The normal weight range physician was more likely to advise obese patients using effective methods to lose weight (Abramson et al., 2000; Bleich et al., 2012; Connaughton, Weiler, & Connaughton, 2001; Puhl et al., 2013; Stanford et al., 2014). Health psychology practitioners who do not model healthy behaviors or lifestyles may also be less effective in terms of conveying their message to clients and students.

In 1978 with the establishment of Division 38, health psychology was recognized as a separate specialty by APA. As greater interdisciplinary research was pursued, the relationships between behaviors of a healthy lifestyle became more clearly defined. The studies of healthy lifestyle components have expanded to include epidemiological, environmental, social, biological and psychological influences (APA, 2014; APA, 2015; Matarazzo, 1980, 1982). During this time of changes within psychology, medicine and other disciplines associated with health, there were also changes in the structure and priorities within CDC (Schoenborn et al., 2013). The climate was open for seeking

answers to modify the occurrence of diseases through use of healthy lifestyle practices as preventive measures to slow rapidly increasing costs for treatment of these disease processes. By 1978, research had demonstrated that unhealthy behavior practices predispose individuals to develop certain diseases, such as cardiopulmonary disease, cardiovascular disease, Type 2 diabetes, metabolic syndrome, some cancers, stroke, and obesity (Meraya et al., 2015; Schoenborn et al., 2013).

The creation of the National Health Interview Survey resided in an act of the 84th Congress which amended the Public Health Service Act to allow for the collection of health data relating to the people of the United States under the jurisdiction of the Surgeon General ("National Health Survey Act," 1956). The first guidelines were presented in the report of the United States Surgeon General (1979) that specifically promoted health and disease prevention. The following year, another report outlined health objectives to be reached by the people of the United States by 1990, setting a precedent of reviewing and adjusting objectives every decade. This reexamination of objectives was accomplished through an interagency efforts under the direction of the United States Department of Health and Human Services (DHHS), CDC, and other agencies in the federal government (Schoenborn et al., 2013). The original objectives were reflective of the changes made to the CDC's priorities during the transition from reactive to proactive public health care under William H. Foege, who served as Director from 1977 through 1983 (CDC, 2006). During this period, the medical community experienced a transition from the traditional medical model of treating disease after it

occurred to an greater emphasis on prevention of disease by examining the contribution of voluntary behaviors as precursors to chronic illness.

The findings and data that was collected between 2008-2010 from interviews with American adults was compared with the objectives and guidelines of CDC (Schoenborn et al., 2013) In addition to normal range BMI, other voluntary behaviors which received attention in this report (Schoenborn et al., 2013) included smoking cigarettes, drinking alcohol to excess, leisure time physical exercise, and sleep (see also Loeff & Walach, 2012). The term, voluntary behaviors, refers to behavior that is under the control of the individual. If these behaviors are of an unhealthy nature, they have been related to an increase in the risk of the development of chronic disease processes. These chronic disease processes tend to occur during the last third of an individual's life (Schoenborn et al., 2013). By practicing healthy behaviors and lifestyle principles, individuals may prevent the occurrence of such diseases or lessen the harm that may be caused.

Results of the National Health Interview Survey interviews indicated that in all of the specific health areas, with the exception of regularly obtaining 7-8 hours of sleep, individuals did not meet or exceed the CDC recommended guidelines (Schoenborn & Adams, 2010; Schoenborn et al., 2013). Adults between the ages of 20 and 74 years in the United States indicated little change from the 2005-2007 survey results (Schoenborn & Adams, 2010) when compared to the results from the 2008-2010 survey (Schoenborn et al., 2013). Schoenborn et al. (2013) described findings which indicated that in the United States, approximately 62% of adults drink alcohol on a regular basis, and 20% of adults are current tobacco smokers. Further, 46% of adults engage in the recommended

amount of aerobic exercise, 23% engage in recommended amount of strength training exercise, 62% were overweight or obese based on BMI calculations, and 70% were obtaining regular, adequate sleep (Schoenborn et al., 2013).

The present static group comparison quasi-experimental designed survey study was used to examine whether online health psychology graduate students engaged in health behaviors to a greater extent than online graduate students enrolled in other programs. The present research examined test results from General Perceived Self-efficacy Scale created by Schwarzer and Jerusalem (1995) which are related to social cognitive theory (Bandura, 1989b, 1999, 2011) and test results from Basic Need Satisfaction in General Scale to measure autonomy, relatedness, and competency (Deci & Ryan, 1985; Ryan & Deci, 2000). The intent was to see if these variables are predictive of online graduate students meeting CDC Healthy People 2020 health objectives. According to the self-determination theory (Ryan, Patrick, Deci, & Williams, 2008; Williams & Deci, 1996), engaging in health behaviors may be a reflection of the internalization of associated values. General perceived self-efficacy mean scores were assessed using the General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) and mean scores for autonomy, relatedness, and competency were assessed with the Basic Need Satisfaction in General scale (Deci & Ryan, 2008; Deci & Ryan, 2015; Faye & Sharpe, 2008; Gagné, 2003).

Literature Search Strategy

The manner in which the literature review was conducted and how this review was selected and organized will be discussed prior to a description of the theories used in

the present study. Due to the lack of research focused on health behaviors of online or traditional health psychology graduate students, pertinent literature relating to graduate students in other health-related study areas will be included from online and traditional institutions. Literature was selected for review that provided information regarding health behavior that had been studied by CDC and were reported by Schoenborn et al. (2013). Emphasis was placed on adult age groups over 18 years of age for review that would be considered common for graduate degree programs and that were reported by Schoenborn. The theoretical framework included the social cognitive theory (Bandura, 1977, 1989a, 1989b, 1999, 2011) and self-determination theory (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000). These theories were described and compared with reference to the present study.

The large online university library's databases PsycINFO, ERIC, MEDLINE, CINAHL Plus, EBSCOHost, SOCINDEX, SAGE Premier, PubMed, and Proquest Central were used in a broad search of recognized psychology, public health, and medical journals. Key words used in these searches were: *leisure time physical activity (BMI, tobacco usage, alcohol usage, and adequate sleep), biological health, United States, graduate student (online graduate student), and healthy lifestyle (adherence to health practices)*. In the absence of many directly applicable articles, relevant articles relating to graduate students in other study areas or in traditional university settings were included.

The selection criteria for inclusion of articles in this review required that articles were from peer-reviewed journals, articles indicated connections between poor health

behaviors and resulting disease processes, articles were specific to content of the study, or provided insight into the motivation of graduate program health psychology students in the United States to maintain healthy lifestyle or model healthy behaviors. Most articles were published within the past five years. Some older articles that made important contributions were also included.

Additional methods of locating key articles included the examination of government agency websites and references located on those websites. Citation chaining by checking references within articles that contained major findings, citation chaining by checking what articles cited an article and checking key words on Google Scholar and PubMed were also used to locate references. Books and textbooks were also accessed for content written by leaders in the areas of health and/or theory, and to locate references for highly influential articles.

This review of literature attempted to be an exhaustive review that provided a current view of each of the variables studied. Those variables are adequate sleep, physical activity, normal BMI, tobacco and alcohol usage as positive or negative contributors to health (see CDC objectives and guidelines at Healthy People 2020, 2013). The present literature review intended to relate each of the measures to online health psychology graduate students. Research relating to these health topics was reviewed, synthesized and summarized with emphasis on areas for additional study. Finally, the importance of the observed gap in the literature was discussed and analyzed.

Theoretical Foundation

Social Cognitive Theory

Studying and engaging in psychological research during a time of behaviorism in the early 1960s, Bandura began to describe a theory that would lead to the expansion of possible behaviors that could be studied (1977, 2005a, 2005b). This theory included a manner for the introduction of new behaviors that allowed for the examination of all types of learning, not simply direct learning which was thought to be a limitation of the prevailing theories. As this theory evolved it provided an expanded human element which dynamically interacted with the social environment and became known as the social learning theory (Bandura, 1977, 2005a, 2005b). Human behavior was thought to be learned through experience and by observation or by modeling of behavior observed in others. The central concept of this theoretical presentation in 1977 was self-efficacy which was “perceived self-efficacy” and was later defined as being “concerned with judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122).

Social cognitive theory emerged from early theorizing to describe humans as agents, thus providing the agentic point of view (Bandura, 1999, 2005a, 2011). This perspective was described by Bandura (1999) as a means whereby the individual would intentionally interact within whatever biological, social or physical environment they found themselves, whether the action was on their own behalf, on the behalf of another (proxy agency), or with others as a group (collective agency). The agent then was both interacting with forces outside and inside themselves.

Each form of agency is endowed with four main characteristics that are intentionality, forethought, self-reactiveness, and self-reflectiveness (Bandura, 1999). Briefly, the definitions of these terms presented by Bandura (1999) include intentionality which refers to actions that lead to a specific outcome providing for planned, strategic actions. Forethought differs from intention in that it projects into the future, providing motivation to continue a behavior in the present and over time as an “anticipatory self-guidance” (Bandura, 1999). Self-reactiveness is another characteristic of agency used by Bandura (1999) to describe the process whereby the individual monitors or watches their progress toward goals. Self-reflectiveness is the process whereby the individual may evaluate, analyze or change their ability to interact with their environment, to relate to their goals, thoughts, feelings, and particularly their self-efficacy beliefs relating to personal capability and comparisons to reality (Bandura, 1999). Working together these characteristics provide the means whereby individuals interact with and shape themselves, their behavior, and their environment through a triadic scheme which includes personal cognitive, behavioral and environmental determinants (Bandura, 2009). Triadic scheme is also known as the triadic reciprocal determinism and describes a model of causal forces operating reciprocally between the individual and their environment (Bandura, 1989a). These reciprocally operating forces shape and form the individual over time and provide the motivation and reinforcement for individual development of various behaviors that become part of the individual and are interdependent with the resources available to them from the social systems and the culture into which they are born (Bandura, 1977, 1989a).

Bandura (1997) noted that the individual agent may exercise considerable control over their health through self-management of lifestyle habits in order to reduce the risks that may lead to future diseases and poor health. The individual's health and that of the country in which he or she resides are described as personal and social matters (Bandura, 2005c). The emphasis becomes entwined with the health literacy of a people, in other words the collective knowledge of the risks and benefits of various practices, the belief that the people hold of their ability to perform healthy habits, and how well the individuals apply that knowledge in their daily lives is to some extent synergistic (Bandura, 2004, 2005b). In applying social cognitive theory to health promotion, the focus is placed upon the individual's self-regulation, self-management and the sense of self-efficacy or ability to carry out the behaviors (Bandura, 2005c).

Bandura (2004, p. 151) observed that "health habits are not changed by an act of will." Knowing that certain behaviors are unhealthy doesn't make some individuals change those behaviors for more healthy ones. Knowledge of physiological results of poor health behaviors is not enough to promote change to more healthy behaviors. The manner in which one incorporates healthy lifestyle behaviors into one's life requires having the perceived self-efficacy and social support to make changes and also to maintain those changes (Bandura, 2004). How, then can the individual learn procedures of putting such positive behaviors into practice? Bandura (2004, 2005b) indicated that much of the guidance can occur through internet and telephone contact with a person of knowledge. Enabling self-regulatory behaviors with guidance when necessary can then

feed into increase of the individual's perceived self-efficacy and aid in the performance and adoption of health behaviors.

Health psychology graduate students undergo rigorous training to gain knowledge of health behavior and associated outcomes. The professional work upon graduation is likely to be to encourage and support health behaviors in their clients. No data is available regarding the engagement in health behaviors among these students. The purpose of the present static comparison quasi-experimental design survey study was to contribute to filling this gap in the literature. This gap was reduced through exploring and reporting whether online graduate students who are studying health psychology engage in health behaviors to a greater degree than online graduate students from other programs. General perceived self-efficacy was a variable in the present study and was measured using The General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). Schwarzer and Jerusalem (1995) described the concept of general perceived self-efficacy as broader and stable across domains than Bandura's situation specific definition.

The following section provided a description of self-determination theory (Deci & Ryan, 1985; Deci & Ryan, 2000) as the theory relates to the present study. A comparison of self-determination theory and social cognitive theory examined the potential relationship of specific concepts to the engagement in healthy behaviors by online health psychology graduate students. The results of online health psychology graduate students were compared with online graduate students in other programs.

Self-Determination Theory

The self-determination theory of motivation was presented by Deci and Ryan (1985) as a meta-theory comprised of four mini-theories. Each of the four mini theories examined a different area within the overall formal theory. The theory provided specific areas for further research that were elaborated by the mini theories. The mini theories were identified as cognitive evaluation theory, organismic integration theory, causality orientations theory, and basic psychological needs theory. A fifth mini-theory, goal contents theory, was added in order to study the manner in which the intrinsic and extrinsic goals interacted with need satisfaction, wellness, and motivation (Deci & Ryan, 2000; Ryan & Deci, 2000).

The organismic approach was used in the self-determination meta-theory (Deci & Ryan, 1985) where organismic refers to the assumption that an individual is born with a tendency to grow and develop. This tendency was viewed as occurring on a continuum that is actively engaged with the individual's inner and outer environments to arrive at need satisfaction while promoting growth and health. The basic innate needs posited are autonomy, competence, and relatedness (Deci & Ryan, 1985). Healthy growth and development was described as the outcome of integration of the satisfied needs, reaching an inner (intrinsic) and outer (extrinsic) balance of motivating forces for organization, and was dependent upon the social conditions that surround the individual at the time of their development (Deci & Ryan, 2002). When the innate needs were not supported within the social and developmental environments, the individual may become alienated and suffer from psychological problems (Ryan & Deci, 2000).

Three needs were described as innate or basic to each person, which require satisfaction in order to support mental and physical health and wellbeing. These basic needs are competence, relatedness, and autonomy. Competence referred to the awareness or sense of confidence an individual feels with regard to their capacity or skill to act within their cultural or social environment (Deci & Ryan, 2002). The concept of relatedness described the feelings associated with connections and belongingness with others and one's community (Deci & Ryan, 2002). Autonomy or autonomous behavior is described in two ways, what it is and what it is not. Weinstein, Przybylski, and Ryan (2012, p. 397) defined autonomy as the regulation of behavior by the individual. Autonomy was not to be confused with independent, selfish, individualistic or self-reliant behaviors (Ryan & Deci, 2000; Weinstein et al., 2012). Instead, autonomous behaviors were described as felt by an individual to be their own creation or a creation of another that has been assimilated into the behavior (Ryan & Deci, 2000). Whether or not these basic needs were satisfied adequately or frustrated has been shown to account for the individual's healthy growth or ill-health (Vansteenkiste & Ryan, 2013).

Motivation is presented in self-determination theory as occurring in three different forms, autonomous motivation, controlling motivation, and amotivation (Deci & Ryan, 2008). These sub-categories of motivation were differentiated by the source whether it is endorsed by the individual experiencing it as in autonomous motivation, or whether an external source was being appeased (Deci & Ryan, 2008). Amotivation is described as without motivation and completes the continuum from no motivation to autonomous motivation and/or controlling motivation (Deci & Ryan, 2008). Each form of motivation

may be intrinsically influenced by the individual's enjoyment, interest in engaging in a particular activity or the sense of pleasure experienced when engaging in such activities which would serve as a reward (Deci & Ryan, 1985). The individual behavior may be influenced by an extrinsic motivation which is influenced by exterior or controlling motivation (Deci & Ryan, 1985). Internalization occurs according to self-determination theory by a process whereby the individual changes the control of behavior from external to internal (Deci & Ryan, 1985). Learned behaviors associated with values, attitudes, goals, societal or cultural mores are posited to be internalized through a process of introjection or integration. Introjection refers to partial internalizing of behavioral control while integration of learned or external behaviors refers to a more complete internalization.

Health behaviors (physical activity, maintaining normal weight, not smoking or drinking alcohol to excess, and maintaining a normal sleep cycle) will be measured in the present study through the use of an online survey. These behaviors are described by self-determination theory to occur normally as a result of internalization as a part of childhood development and the satisfaction of basic needs within a supportive environment (Deci & Ryan, 1985). Internalization was defined by Deci and Ryan (1985, p. 130) as a natural, developmental process that occurs as an individual willingly engages in behaviors to gain "an attitude, belief, or behavioral regulation and progressively transforms it into a personal value, goal, or organization." The internalization may occur from four sources which are external regulation, introjected regulation, self-regulation through identification, or integrated self-regulation (Deci & Ryan, 1985, p. 140). Each of these

methods of internalization provides a demonstration of a slightly different place on the pathway leading to integrated self-regulation. This static group comparison quasi-experimental design study examined the internalization of health knowledge as reflected in self-reported behaviors measured with a survey. Those behaviors were sufficient sleep, normal range BMI, engagement in leisure time physical activity, not smoking cigarettes, and moderation or abstinence from drinking alcohol.

Deci and Ryan (1985) described the development of self-determination as a continuum from non-regulation which occurs at the neonatal or infant stage and each of the stages occurring naturally as the child develops ultimately ending in the full self-determined behavior. External regulation refers to the anticipation of the imposition of external, social contingencies that occurs with certain behaviors that are imposed by outside forces, initially the parents of an infant act as the outside force (Deci & Ryan, 1985, p. 135). Introjected regulation occurs when the regulation of behavior, attitudes, or beliefs takes place through a process of internalizing them in their original forms, although stopping short of completely owning them (Ryan & Deci, 2000). An example of this would be when a child doesn't engage completely in rough play behavior that previously resulted in reprimand from authority. In this example the child exhibited self-control by not completely engaging in rough play (Deci & Ryan, 1985, p. 136). Self-regulation through identification is quite similar to introjected regulation, in that the regulation of behavior, attitudes, or beliefs was internalized without change from original form. The concept of self-regulation refers to acceptance of responsibility for actions, as well as having flexibility in behavioral choices because identifications with behavioral

outcomes and regulations have become the introjected regulations that are their own and thus those introjected regulations become self-determined (Deci & Ryan, 1985, pp. 137-138).

Vansteenkiste and Ryan (2013, p. 264) noted that although growth is promoted in a supportive environment, there is a risk of functioning in a less positive manner in a nonsupportive or controlling environment. Release of self-control is one form of maladaptive functioning resulting from lack of basic needs satisfaction and non-supportive environmental factors and has been described as likely to produce self-harming behaviors such as alcohol abuse or binge eating (Vansteenkiste & Ryan, 2013). When behavior is autonomous, the individual is capable of being in a harmonious state with their values, interests, and, in a mindfully aware manner, to behave so that the effect is one of synergy, building up the further satisfaction of needs (Vansteenkiste & Ryan, 2013).

Self-determination theory differs from other theories, including Bandura's social cognitive theory, specifically in the use of the terms of autonomy and autonomy support (Ng et al., 2012, p. 336). This uniqueness of self-determination theory can be used to describe a relationship between online health psychology graduate students engaging in healthy behaviors who internalized the health principles that they have studied.

Autonomy in this theory (Deci & Ryan, 1985) describes a composite of values and internalized rules of behavior that are thought to contribute to changes of behavior being maintained over the long-term (Ng et al., 2012, p. 336). With this in mind it is likely that the online health psychology graduate student who experiences basic need satisfaction, in

other words is high in autonomy, competency and relatedness as measured by the Basic Need Satisfaction in General scale (Deci & Ryan, 2015; Faye & Sharpe, 2008; Gagné, 2003) would internalize health principles, and engage in healthy behaviors. The manner in which internalization of health principles would be observed is in maintaining healthy behaviors such as obtaining adequate sleep, exercising, maintaining weight in normal range, not smoking and drinking in moderation if at all.

Theory Comparison

There are two significant differences between social cognitive theory, as cognitive behaviorism, and self-determination theory. Social cognitive theory views the individual as acquiring behaviors that provide them with extrinsic rewards from the social or cultural environment (Bandura, 1977; Deci & Ryan, 1985). In other words, the general focus for behavior under social cognitive theory is in the extrinsic or external world, not the intrinsic or internal realm of the individual as it is with self-determination theory. The concept of perceived self-efficacy is also derived from the extrinsic world and thus is dependent upon and supported by external reinforcement to maintain or modify associated behaviors (Bandura, 1977; Glanz & Bishop, 2010). These theories differ in the site of control for behaviors whether the extrinsic socio-cultural environment of social cognitive theory or the intrinsic need satisfaction of self-determination theory.

The theoretical concepts of general perceived self-efficacy, autonomy, relatedness, and competency were examined to determine if there was a relationship between the measured concept and the engagement in the healthy lifestyle components related to physical activity, not smoking, abstinence or moderate drinking of alcohol,

maintaining normal weight, and obtaining adequate sleep among online health psychology graduate students. The present research was designed to explore engagement in healthy behaviors by online health psychology graduate students. Demographic and health behavior data were obtained from online health psychology graduate students to compare with online graduate students in other programs with respect to CDC health guidelines and objectives. The philosophical framework and assumptions of this study are related to pragmatism (Creswell & Plano-Clark, 2011). This framework supports obtaining data through quantitative means to compare the data to existing theory.

Healthy Lifestyle Guidelines and Recommendations

The healthy lifestyle components included in the present study were to obtain sufficient sleep on a regular basis, maintain a normal range BMI, not smoking cigarettes, not drinking alcohol or drinking only in moderation, and engaging in aerobic and muscle strengthening leisure time physical activities. The specific objectives were defined in 2008 federal guidelines for each of these components and are found at internet web site locations for Healthy People 2010, Archive and Healthy People 2020 (CDC, 2013, n. d.), and are also presented in Appendix C. The guidelines and objectives defined by Healthy People 2020 were used in the present study to compare with survey health behavior data from online health psychology graduate students and online graduate students of other disciplines. The online graduate students' data was examined to determine if they met the objectives for health behavior and whether there the graduate student groups differed in meeting those objectives.

It is important to note that when one health component is not in balance with other health components within an individual, the component that is out of balance may act as a risk factor for development of disease. For example, if an individual's sleep pattern is disrupted on a regular basis, there would be an increased risk along with increasing fatigue which could then lead to accidents as well as to the development of obesity, cardiovascular disease, diabetes, or hypertension (Booth et al., 2012; Buxton & Marcelli, 2010; Grandner, Chakravorty, Perlis, Oliver, & Gurubhagavatula, 2014; Lombardi, Wirtz, Willetts, & Folkard, 2012). Stated another way, when one component is negatively or positively affected then other components of the body may be affected to some degree. One possible scenario would present a person who is not regularly sleeping 7 to 8 hours per night, becomes fatigued and as a result may not engage in the recommended amounts of physical activity or strength training all of which may then predispose the individual to obtain less than adequate sleep (Buxton & Marcelli, 2010; Lombardi et al., 2012). The variables that have been surveyed by CDC were voluntary behaviors thought to lead to increased costs associated with healthcare for preventable chronic diseases and that are yet to be thoroughly examined regarding the possible and probable interrelationships of the behavioral outcomes. The present static group comparison quasi-experimental research described health behaviors of online graduate students. As an initial examination using non-random assignment to participant groups, the data may not be broadly generalized or be used to support causal statements relating to health behaviors of graduate students.

Sleep

The Healthy People 2020 website (CDC, 2013) described recommended sleep hours that are sufficient for adults as 7 or more hours within a 24-hour period. This recommendation depends partially on the age of the individual so that 22 year old and older adults may require an average of 7 or more hours sleep while a younger person may require more sleep (CDC, 2013). Other factors that influence obtaining adequate sleep include the quality of sleep and whether there is a sleep disorder present. The CDC (2013) noted that inadequate sleep, or less than recommended hours of sleep over time, may be insufficient to support health and therefore becomes a contributing factor in the development of diseases such as “diabetes, high blood pressure, cardiovascular disease, obesity, depression, cognitive dysfunction, and injury” (see also, Banks & Dinges, 2007; Buxton & Marcelli, 2010; Cappuccio, D'Elia, Strazzullo, & Miller, 2010; Foley, Sarsour, Kalsekar, & Walsh, 2010). It is also important to note that too much sleep (an average of 9 hours or more of sleep in a 24-hour period) or too little sleep (an average of 6 or fewer hours of sleep in a 24-hour period) both indicate greater mortality risk (Cappuccio et al., 2010; see also Grandner et al., 2014).

Ethnic groups demonstrate similar sleep difficulties to those of whites (Grandner et al., 2010), however people who are living in poverty with less than post-college level education have been shown to exhibit greater incidence of sleep disturbance (Grandner et al., 2010; Patel, Grandner, Xie, Branas, & Gooneratne, 2010). After controlling for age, body mass index, socioeconomic status, and smoking status, African Americans who feel they have been discriminated against or who are under stress differ from Caucasians in

the duration of their sleep stages leading researchers to posit differing “sleep architecture” (Tomfohr, Pung, Edwards, & Dimsdale, 2012). Sleep architecture is a term used in sleep research to describe electroencephalographically generated cycles and stages of sleep that are divided into four stages of non-rapid eye movement and rapid eye movement sleep associated with various depths of sleep, brain waves, and muscle tone (Institute of Medicine (US) Committee on Sleep Medicine and Research, 2006; Tomfohr et al., 2012).

The incidence of self-perceived sleep deprivation and resultant fatigue is a growing problem that has been associated with barriers to learning among clinical health science graduate students (Kernan, Bogart, & Wheat, 2011), among medical students (Brick, Seely, & Palermo, 2010), workplace accidents and the loss of productivity (Wells & Vaughn, 2012). Sleep deprivation was correlated with the development of obesity among United States adults (Buxton & Marcelli, 2010; Wheaton et al., 2011), and was recognized as a risk factor for the development of numerous chronic diseases, as noted previously (Schoenborn et al., 2013). Recent information indicated that Alzheimer’s Disease may be predicted by changes in sleep pattern (Hahn, Wang, Andel, & Fratiglioni, 2013), sleep disturbances (Ownby, Peruyera, Acevedo, Loewenstein, & Sevush, 2014) or fragmentation of sleep with subsequent cognitive decline (Ju et al., 2013; Lim, Kowgier, Yu, Buchman, & Bennett, 2013). The potential effect of sleep patterns on the development or progression of disease such as Alzheimer’s disease indicate the importance of the relationship between sleep and health.

Inadequate sleep, the perception of poor quality sleep or sleep disorders are all linked to poor sleep hygiene and have been shown to negatively affect scholastic performance in undergraduate college students (Adams & Kisler, 2013; Brick et al., 2010; Forquer, Camden, Gabriela, & Johnson, 2008; Gaultney, 2010; Lund, Reider, Whiting, & Prichard, 2010; Orzech, Salafsky, & Hamilton, 2011; Taylor, Vathauer, Bramoweth, Ruggero, & Roane, 2013). Articles relating to sleep patterns, sleep duration or sleep quality in health psychology graduate students are scarce to nonexistent. In one of the few related articles, Forquer et al. (2008) compared sleep of undergraduate and graduate health sciences students and found no difference between the two groups with regard to length of time prior to falling asleep, number of hours slept or number of awakenings in the night. One other study found sleep difficulties in 51.7% of students with negative academic impacts which occurred to a greater extent in clinical than in nonclinical graduate students (Kernan et al., 2011). Also noted was the presence of perceived stress which is thought to interfere with normal sleep was found in 75.4% of all graduate students tested (Kernan et al., 2011). Oswald and Wyatt (2015) presented data that indicated that although graduate students had poor sleep habits their sleep habits were closer to normal than undergraduate students.

One study that involved clinical psychology graduate students focused specifically on self-care practices which included regular exercise, healthy sleep practices, social support, mindfulness, and emotional regulation (Myers et al., 2012). Myers et al. (2012) examined the importance of the clinician being able to engage in training to gain competence in self-care practices so that this competence could then be

conveyed to the client. Lower levels of sleep hygiene and perceived stress were associated with older, married students (Myers et al., 2012).

McGrady and Moss (2013) presented a model for health care that suggested the chronic illnesses may enter a remission stage if the poor health practices that lead to the illness are reversed. Long-term care costs would likely be reduced dramatically and quality of life increased if disease processes could be reversed to some degree by increased adherence to healthy practices through greater acceptance of personal responsibility by young or middle-aged adults (McGrady & Moss, 2013, pp. 100-101). As to the question of whether or not disease can be overcome if adequate sleep is reinstated awaits future research that could provide evidence to support or deny this possibility.

Who are the people that Schoenborn et al. (2013) found that practiced good sleep hygiene? Even though the findings of this study indicated that 7 in 10 adults obtained adequate sleep, this statistic does not describe some subgroups that do not mirror the 7-8 hours of sleep during a 24-hour period described as adequate or sufficient. People in “metropolitan statistical areas” were more likely to be short sleepers sleeping 6 hours or less per 24-hour period, while long-sleepers who slept an average of 9 hours or more, were individuals who lived outside of such an area (Schoenborn et al., 2013, p. 70). Other differences were noted in geographic area of the United States finding that individuals living in the western portions of the United States are more likely to get adequate sleep than individuals who lived in other locations (Schoenborn et al., 2013, p. 70). Education appears to contribute to the likelihood of obtaining adequate sleep since it

was associated with those who have achieved a bachelor's or higher degree (Schoenborn et al., 2013, p. 70).

While no differences were found between males and females in meeting the objective for adequate sleep, the marital status does show short sleep averaging 6 hours or less occurring among divorced or separated adults, while the never married, cohabiting, and married adults were more likely to have adequate sleep (Schoenborn et al., 2013, p. 70). Individuals who are at or below the poverty level are found to be more likely to be long sleepers who average 9 hours or more in a 24-hour period (Schoenborn et al., 2013, p. 70). The results of the 2008-2010 National Health Interview Survey (Schoenborn et al., 2013) indicated that individuals who obtained adequate sleep are more likely to live in the Western United States, are white or Hispanic adults who have attained a level of education at or above a bachelor's degree, have a family income above the poverty level, and live within a metropolitan statistical area (see also Chapman et al., 2012).

Sleep practices and awareness of the impact they have on the individual's health and wellbeing are important to the individual and to society due to cost of care and loss of productivity in individuals who are at risk for or develop a chronic debilitating disease as a result of disturbed sleep (Bansil, Kuklina, Merritt, & Yoon, 2011; Chapman et al., 2012; Foley et al., 2010; Liu et al., 2013). A pilot study has produced data indicating that cognitive behavioral therapy reduces the severity of sleep disturbances in college students potentially averting the development of lifelong problems (Taylor et al., 2014).

The United States Department of Health and Human Services and CDC have regularly conducted studies since 1990 using the National Health Interview Survey (CDC, 2014d) to obtain data related to the health behavior and demographic characteristics of the participants. These studies have amassed data points with a great many individuals in the United States, although participants have not been longitudinally followed (Bansil et al., 2011; Schoenborn & Adams, 2010; Schoenborn et al., 2013). Each of these studies used carefully constructed definitions of what would be adequate for the health behavior and then the data was analyzed to arrive at recommendations for CDC or Health and Human Services websites. The Healthy People 2020 objectives were used as a comparison with the data obtained from online graduate students in the present research to determine whether these participants are engaging in health behaviors as recommended by CDC. The present static group comparison quasi-experimental design research used the same health behaviors obtained from the CDC studies, along with the recommended objectives and guidelines.

Measurements of sleep have varied between studies and have met some controversy relating to the validity and reliability of the method used to report sleep duration. Most of the studies involving a sleep measure have used one or more sleep questionnaires to provide data regarding whether the individual has experienced short sleep, normal sleep or long sleep in the preceding month. Alternatively, the individuals are given a sleep journal to record bedtimes and rise times over a one week period in addition to a taking one or more questionnaires relating to sleep practices and demographic details. Some studies use a wrist actigraph or if there is a sleep lab

available will use polysomnography which is described by Girschik et al. (2012) as the gold standard of sleep measures although the self-report using a sleep diary is substantially more cost-effective. Previous work by Lauderdale et al. (2008) indicated that the self-reported sleep duration was not well validated leading to the recognition of possibly biased reports. Another issue with the measurement of sleep is that the wrist actigraph may measure all inactivity as sleep, and may also differ from perceived sleep reports (Girschik et al., 2012). Similar discrepancies have been noted in adolescents in a comparison of the use of sleep diaries and actigraphic measures, although this may be due to the incidence of movement in sleep of male adolescents (Short et al., 2012). Care must be therefore kept foremost in mind when evaluating the methods used and their limitations in the sleep research.

Using the secondary data from American College Health Association-National College Health Assessment II survey, sleep patterns of undergraduate and graduate students were studied without identification of school or program of study. Findings of these studies were presented and indicated slightly better sleep hygiene practices among the graduate students when compared to undergraduates. Additionally, the graduate students were also found to have less stress and fewer mental health issues than undergraduates. (Oswalt & Wyatt, 2015; Wyatt & Oswalt, 2013). All of these participants were identified as being an average of 20.84 years if an undergraduate, and an average of 27.33 years if graduate student and did not include anyone over 50 years of age. Oswalt and Wyatt (2015) further noted the importance of maintaining good sleep habits that increase the likelihood of having a positive experience in graduate school and

contributes to their success. Sleep hygiene was defined in this study as “a variety of behaviors needed to have normal, quality nighttime sleep and full daytime alertness” (Oswalt & Wyatt, 2015, p. 81). This does not directly relate to the CDC objective of sufficient sleep that is 7-8 hours of sleep in 24-hour period for adults age 22 years and over.

The present static group comparison quasi-experimental design research measured sleep in the participants (online health psychology and online graduate students from other programs at a large online University) by obtaining their self-reported answer to a survey question similar to those designed by NHIS and reported by Schoenborn et al. (2013). The health interview questions used by NHIS were modified to be completed by the participant in an online survey. The interview questions reported by Schoenborn were developed to be administered by trained interviewers in a face-to-face situation with the interviewer registering participant answers in a computer program that would then suggest follow-up questions to be asked based upon the answer provided. The current research did not use the computer interactive type of interview used by NHIS for many reasons (e.g., the costs of hiring and training professional interviewers, providing computers, software, travel expenses for interviewers to go to participant locations, and having federal employees to analyze and write-up data). The present study represents an initial descriptive examination of this population.

The examination of health habits of online-health psychology graduate students is of interest due to differences from undergraduate participants of previous research. Those differences include being older, employed full or part-time, living in a family

group with spouse, children or other person(s), and specific interest as exhibited by choice of graduate program of study. The present research occurs in an area previously not studied and examined engagement in healthy behaviors among online health psychology graduate students and online graduate students of other programs.

In summary, sleep research has provided no data from online graduate health psychology students, and little data obtained from online graduate students in general (Forquer et al., 2008; Kernan et al., 2011; Myers et al., 2012). The least expensive method of obtaining sleep data has been with sleep journals. Other means of gaining sleep data that are commonly used include wrist actigraph and polysomnography. Self-reported sleep data has been criticized by some as not being valid (see for example, Lauderdale et al., 2008) although Girschik et al. (2012) noted that validation varied among all of the methods used to document sleep and that the most cost-effective measure was found in the use of a sleep journal. The present static group comparison quasi-experimental design survey research did not use the sleep journal since participants will respond to a survey on a single day rather than over time. As noted previously, caution must be used when evaluating the methods used and their limitations in sleep research.

Leisure Time Physical Activity

CDC may have underestimated the amount of physical activity engaged in by adults who were interviewed since the only requested information related to leisure time physical activity, instead of to all types or areas of physical activity (Schoenborn et al., 2013). An additional area of physical activity may be related to work duties or

participation in organized sports (Schoenborn et al., 2013). The physical exercise objectives that are presented by Schoenborn et al. (2013) were derived from research that highlighted health benefits observed in studies of physical activity of individuals in the United States (Office of Disease Prevention and Health Promotion, Office of the Assistant Secretary for Health, Office of the Secretary, & U.S. Department of Health and Human Services, 2008). The present static group comparison quasi-experimental design survey research focused on individuals who lived in the United States, were over 18 years of age, and who were attending a large online university either in the area of health psychology and graduate students from other online graduate programs.

The objectives for adults that appear in the 2008 *Physical Activity Guidelines for Americans* (Office of Disease Prevention and Health Promotion et al., 2008) relate to a broad group that included people from children to older adults. Leisure time physical activity as presented in the 2008 *Physical Activity Guidelines for Americans* (Office of Disease Prevention and Health Promotion et al., 2008) encompasses aerobic, also known as endurance activities, as well as muscle strengthening training activities of moderate to vigorous intensity. Recommendations of the length of time to spend in each activity are designed to meet the objective for that activity and to realize substantial health benefits (Office of Disease Prevention and Health Promotion et al., 2008). The number of minutes to spend in aerobic or muscle strengthening activities count toward the objectives for both physical activity and leisure time physical activity, however the broader exercise that includes sports or as a part of an active occupation only adds to the minutes of exercise for physical activity (Office of Disease Prevention and Health Promotion et al.,

2008). The guidelines were intended to aid Americans in reaching or surpassing the Healthy People 2020 objectives (CDC, 2013). The objectives presented here were included in Healthy People 2010 (CDC, n. d.) and remain unchanged in Healthy People 2020 (CDC, 2013).

The 2008 objectives described for adults may be found at the online website for Healthy People 2020 or in Schoenborn et al. (2013, p. 44) and provide for the following:

- the reduction of the percentage of individuals to less than 32.6% whose lives are largely sedentary and do not engage in leisure time physical activity,
- to increase to 47.9%, or more the number of adults who engage in at least 150 minutes per week of moderately intense aerobic activities, 75 minutes per week of vigorous intensity exercise, or a combination of the two levels of exercise,
- to increase to 31.3% or more, the number of adults who engage in at least 300 minutes per week of moderate intensity exercise, 150 minutes per week for vigorous intensity, or a combination of the two levels of exercise,
- to increase to 24.1% the number of adults who engage in strength training on at least two days per week, and
- to increase to 20.1% or more adults who meet objectives for both strength training and aerobic exercise.

Schoenborn et al. (2013) indicated that the percentage of individuals who are inactive or do not engage in leisure time physical activity was 33.9% while the percentage of people who met the aerobic activity objective was 46.1%. Muscle strengthening activities findings indicated that 23.0% of adults met the objective while

19.4% of adults met the objectives of both aerobic and muscle strengthening activities (Schoenborn et al., 2013). An examination by gender provided that about one-half of males met the objectives for aerobic physical activity while fewer females do so (42.1%), and only 23.1% of males met both aerobic and muscle strengthening physical activity objects while fewer than 15.8% of females met both objectives (Schoenborn et al., 2013). Younger adults are more likely to meet both objectives than are older adults (Schoenborn et al., 2013).

Caucasian or Asian individuals were more likely to engage in and meet objectives for aerobic physical activity than individuals who were non-Hispanic black, Hispanic or Latino. Meeting both objectives for physical activity was more likely in the Caucasian group (20.1%), with Asian and non-Hispanic black adults at 15.5% and 16.7%, respectively (Schoenborn et al., 2013). Individuals residing in the western states are more likely to meet both objectives for physical activity, while those in the southern states are least likely to meet those objectives (Schoenborn et al., 2013). People who live in metropolitan statistical areas, both small and large, were more likely than individuals who resided in rural areas to meet both objectives for physical activity (Schoenborn et al., 2013).

Educational level influenced the engagement in leisure time physical activity so an individual who had a graduate degree was more likely to engage in and meet objectives for physical activity than someone who attended some college or obtained a high school diploma (Schoenborn et al., 2013). Individuals with higher family incomes were more likely to meet the objectives for both aerobic and muscle strengthening

physical activity (Schoenborn et al., 2013). Individuals who were married, co-habiting, or never married met aerobic objectives more often than did widowed individuals and never married individuals were more likely to meet muscle strengthening objectives than other marital groups (Schoenborn et al., 2013).

Literature presented here highlighted various aspects of health as it related to or was the result of the engagement in leisure time physical activity among college students. Studies that were conducted with participants in countries other than the United States are only included if they provided an important point. Studies that indicated health effects of leisure time physical activity may not have been conducted using participants who were master or doctoral graduate students in the United States although research has been conducted with undergraduate college students and the general public. Furthermore, some of the articles included here present data that examined connections between physical activity and body mass index, binge drinking, tobacco usage, sleep, and other health measures. There is a gap in the literature regarding the health practices of health psychology graduate students and how well they meet Healthy People 2020 objectives whether they attend traditional school or online. In addition to BMI, the specific health behavior measures examined in this research are sleep, leisure time physical activity, tobacco and alcohol usage to evaluate the students' ability to integrate health behaviors into their lives. Research that used undergraduate participants was not reviewed here because it was not comparable to sample population of online health psychology graduate students.

Regularly engaging in leisure-time physical activity of a moderate to vigorous level is most likely to provide many significant health benefits to adults of all ages particularly if it is performed as a combination of both aerobic and muscle strengthening. The present static group comparison quasi-experimental design study examined the question relating to whether an online graduate student of health psychology will integrate both forms of leisure-time physical activity at the levels known to promote health benefits. Physical therapists and students of physical therapy engaged in physical activity that exceeds the levels reported by Schoenborn et al. (2013), but only physical therapy students are likely to feel the importance of modeling the behavioral attitudes associated with healthy lifestyle choices (Black et al., 2012; Chevan & Haskvitz, 2010). The importance of presentation of a model of health to clients or patients to lend credibility to the message was studied in the disciplines of medicine and physical therapy. Within physical therapy, practitioners and graduate students appreciated the need to model the behaviors being discussed however the practitioner is less likely to maintain those behaviors (Black et al., 2012; Chevan & Haskvitz, 2010).

The medical discipline has presented the question of whether the physicians and medical students are able to discuss physical activity with their patients (Abramson et al., 2000; Connaughton et al., 2001; Frank et al., 2000; Puhl et al., 2013; Stanford et al., 2014). If physicians and medical students met the objectives in *2008 Physical Activity Guidelines for Americans* or regularly engaged in moderate to vigorous exercise in their own lives (Office of Disease Prevention and Health Promotion et al., 2008) they were twice as likely as those who did not meet the objectives for exercise to discuss physical

activity with patients. This was thought to be in part due to their attitudes toward exercise, its importance to health as well as the physician's self-perceived competence (Gnanendran, Pyne, Fallon, & Fricker, 2011; Stanford et al., 2014; Vallance, Wylie, & MacDonald, 2009). Gnanendran et al. (2011) also noted the tendency of medical students to reduce their physical activity as they went through their course of study, something that may occur with graduate students in other health related disciplines.

Community dwelling participants who were not identified as college students were found to have reduced risk indicators for disease when compared to participants who either did not have a dog or did not walk the dog (Lentino, Visek, McDonnell, & DiPietro, 2012). Risk indicators that were used in this study were identified in *Healthy People 2010* (CDC, n. d.) and specifically included physical activity, and BMI as measures to categorize weight, tobacco and alcohol usage, chronic conditions, depressive symptoms and social support (Lentino et al., 2012, pp. 415-416).

An example of the influence of physical activity upon health in participants who are not designated as college students is presented by Moore et al. (2012) who examined self-reported moderate and vigorous leisure time physical activity and body mass index among 654,827 participants with median age of 61 and range from 21 to 98 years of age. Data from the participants derived from the National Cancer Institute Cohort Consortium was pooled for further analysis (Moore et al., 2012). Findings indicated that exercise between the recommended 150 minutes of moderate to vigorous physical activity per week to 300 minutes of brisk walking per week was associated with longer life

expectancy while very low levels of activity among obese individuals may reduce significantly the life expectancy (Moore et al., 2012).

A longitudinal study evaluated cardio-metabolic risks both at the beginning and end of the 3-year curriculum of graduate students in a doctoral physical therapy program (Racette et al., 2014). Participants (N = 134) were between the ages of 21 and 36 years of age (Racette et al., 2014). Measures taken included BMI, waist circumference, hip circumference, estimates of fat mass, fat-free mass, and % fat mass, resting heart rate and blood pressure, and blood tests to determine glucose and lipid concentrations (Racette et al., 2014). Self-reported information was requested in a survey questionnaire format that included general demographics and specific questions relating to physical activity, the amounts of fruits/vegetables eaten and hours of sleep over the prior week (Racette et al., 2014). Findings indicated that the graduate students' health deteriorated during the period in school when physical activity lessens as exhibited by increased adiposity and increases of adverse lipid concentrations (Racette et al., 2014). Racette et al. (2014) suggested that if students made minor changes in their exercise and diet they might see different results showing no deterioration since entrance to graduate school.

Research that examines the practice of healthy behaviors provides important insights into the ability of individuals to reduce the future incidence of major disease through their behavioral choices. One international case-controlled study among 52 countries found that approximately three-fifths of the deaths from myocardial infarction were preventable if individuals engaged in the practice of health behaviors (Yusuf et al., 2004). Nine risk factors related to modifiable behaviors were identified as smoking, lipid

levels, self-reported hypertension or diabetes, obesity, diet, physical activity, alcohol consumption, and psychosocial factors (Yusuf et al., 2004, p. 938). Further noted was the greater importance of smoking and abnormal lipid levels as risk factors for early death from myocardial infarction (Yusuf et al., 2004). Examining the risk factors with odds ratios across various countries and ethnicities provided very robust, clear and consistent results. Similar statements have been made with regard to prevention or improvement of cardiovascular health by the American Heart Association (Pearson et al., 2013)

Various methods have been used to measure physical activity and they all appear to yield similar results although that assumption has been open to controversy. Generally, the measurements of physical activity were either self-reported, as with a questionnaire, survey, or journal, or digitally, as with accelerometry, or actigraphy. Self-reported data is unverifiable and may be over-stated or under-stated and the standardization of digital devices has not occurred leaving less than accurate and reliable record of actual activity. Particularly controversial is whether self-reported data is reliable when compared to data obtained through use of electronic devices such as accelerometers or pedometers. Questionnaires, journals wherein the individual documents daily physical activity have occasionally been used together with the electronic methods to provide both measures of activity, duration and frequency of activity. In a systematic review, Prince et al. (2008) examined such a comparison, finding that self-report and direct measurement levels of activity differ, thus pointing to the need for accurate methods that yield valid, and reliable measurements.

The importance of physical activity for health in the general population has been clearly outlined by research; for example, a recent article presented a description of the importance of exercise in the treatment of 26 chronic diseases (Pedersen & Saltin, 2015). Maintaining an exercise program can be seen to increase the efficiency of sleep and reduce the likelihood of being overweight or obese. Each of these three areas have been studied to determine their relationship to the incidence of chronic disease which are associated with significant costs for treatment as the individual ages (Schoenborn et al., 2013). Costs of United States health care associated with inactivity or lack of adequate activity, with and without obesity were studied (Carlson, Fulton, Pratt, Yang, & Adams, 2014). Reported results for inactive and inadequately active adults, low and middle income adults were associated with significant financial burden to health care (Carlson et al., 2014; Pratt, Norris, Lobelo, Roux, & Wang, 2014).

The methodologies used to study leisure time physical activity and strength training vary from face-to-face interviews, mailed packets of questionnaires and journals to be filled out over a period of time and returned for follow up analysis, or secondary data analysis to determine whether there are connections between health practices with mortality. More frequently, recent studies have used medical testing to determine the underlying health of the individual by obtaining estimates of the level of fitness that include glucose and lipid levels, percentage of fat mass and measures of physical activity (Racette et al., 2014). Although the inclusion of electronic monitoring of participants may well lead to greater understanding of the processes that determine the effects of

leisure time physical activity and strength training on the body, it may be that those studies will be undertaken to a greater extent as the basic knowledge is expanded.

Leisure time physical activity research is also lacking in the area which examines the likelihood of online health psychology graduate student meeting or exceeding the objectives of Healthy People 2010 or Healthy People 2020 (CDC, 2011, n. d.). Research has examined physical activity among physical therapy graduate students and therapists (Chevan & Haskvitz, 2010), graduate students of many disciplines (Racette et al., 2014), medical doctors and counselors (Abramson et al., 2000; Connaughton et al., 2001; Frank et al., 2000; Gnanendran et al., 2011; Stanford et al., 2014; Vallance et al., 2009).

Research examining leisure time physical activity has been conducted using quantitative designs to examine who exercises, how much they exercise, how regular is exercise engaged in, does it affect either patient perceptions or the attitudes relating to exercise, and are there any positive or negative effects to chronic non-communicable disease that may be present.

There appears to be a consensus among research scientists that self-reported data may not be as reliable as that obtained by electronic means however the number of studies which rely upon self-reported data still provides the greater portion of research in this area. The use of self-reported data may be in some cases a precursor to a study which attempts to delve deeper by obtaining biological data that relates to the physical fitness level. The present static group comparison quasi-experimental design survey study used questions which were similar to those used to gather data reported by

Schoenborn et al. (2013). The participants' answers to these questions included self-reported levels of activity.

Overweight and Obesity

Awareness of a growing problem of the increased incidence of obesity in the population of the United States and other developed countries has been spotlighted by recent reports of the Surgeon General (2010; 2001). The reports of the Surgeon General provide oversight of trends, as well as the associated significance of the burden, the causes and effects of obesity noting that it was an “epidemic” (2010, p. 2; 2001). The burden of obesity was described by the cost associated with treatment of obesity as well as the harm to individual lives caused by chronic diseases for which obesity is a risk factor (United States Department of Health and Human Services, 2010).

Body mass index (BMI) is computed from weight and height and is considered to be a measure of the amount of body fat a person has gained for the normal proportionate weight to height range and whether the individual is underweight, overweight or obese (Schoenborn & Adams, 2010; Schoenborn et al., 2013). Calculators that compute BMI may be found on the internet and use feet and inches for height and pounds for weight or metric equivalents using an equation which divides the height in centimeters by the weight in kilograms squared (CDC, 2014a). The BMI value ranges used in this study to represent underweight, normal or healthy weight, overweight or obese were 18.5 and less, 18.5 to 24.9, 25.0 to 29.9 or 30 and higher, respectively (Schoenborn et al., 2013). Further noted by Schoenborn et al. (2013) is the relationship between BMI, physical activity and eating choices. As BMI increases, eating choices reflect fewer fruits and

vegetables and greater eating of fatty or dense calorie foods, while physical activity generally is seen to decrease (Schoenborn et al., 2013).

Findings reported by Schoenborn et al. (2013) showed that 62.1% of adults sampled were described as overweight (34.8%) or obese (27.4%). The adults described as being within the healthy weight range accounted for 36.1%, while 1.8% of adults surveyed were underweight (Schoenborn et al., 2013). The details of sex, age, race, whether Hispanic or Latino, education, marital status, geographic region and having a large or small metropolitan urban residence fills out the description of the individual who practices healthy lifestyle components.

According to the findings of Schoenborn et al. (2013), men were more likely than women to be overweight as were adults of both sexes who were between the ages of 45 and 65 years. The most likely to be underweight was seen among 75 year old and older adults and among the 18 to 24 year old adults (Schoenborn et al., 2013). Racial differences find that 38.2% of white adults, 28.3% of non-Hispanic black and 27.6% of Hispanic adults were within the healthy weight range, while the range of overweight or obese adults by race was from 41.5% of Asian adults, 61.9% of white adults, 70.4% of Black or African American, 71.1% of American Indian or Alaska Native, to 73.4% of Native Hawaiian or other Pacific Islander (Schoenborn et al., 2013).

Adults who have graduated from a college with a degree in an unspecified major (e.g., bachelor of arts, or science degree, masters, doctorate, medical degree) were less likely to be overweight or obese, although the likelihood of higher BMIs occurred among adults with less education (Schoenborn et al., 2013). Adults who never married or were

cohabiting were more likely to be of normal weight than married, separated or divorced adults (Schoenborn et al., 2013). Individuals who lived in either the western or northeastern United States were more likely to be of normal weight than adults who lived in other geographical areas (Schoenborn et al., 2013). Adults living in a metropolitan area were more likely to be of normal weight and less likely to be overweight than those who lived outside of either a large or small metropolitan area (Schoenborn et al., 2013). Data described by Schoenborn et al. (2013) presented the individual who would most likely maintained a normal weight would be a single race Asian adult between 18 and 24 years of age who lives in a large or small metropolitan area in the Northeastern or Western United States. Additionally, this person has an income in excess of four times the poverty level, is unmarried or cohabiting, and has pursued higher education and obtained a graduate degree (Schoenborn et al., 2013).

Research worldwide has noted the development of preventable chronic non-communicable disease conditions directly related to obesity (e.g., diabetes 2, cardiovascular disease, metabolic syndrome and subsequent premature mortality). The interactions of obesity/BMI with other variables such as diet, stress, sleep, physical activity or sedentary behaviors, alcohol and tobacco usage continue to be examined by CDC. Research that relates to the incidence of obesity in health psychology graduate students in the United States is sparse to nonexistent.

For a period of 12 years, Stevens et al. (1998) conducted a study using data from the Cancer Prevention Study I of 62,116 men and 262,019 women between the ages of 30 and 85, who were non-smokers and were in good health to examine the effect of BMI on

mortality. Results indicated that while higher levels of BMI were associated with greater risk of death from all causes, the risks of death were greater among younger participants (Stevens et al., 1998). The possibility of under-reported weights among the overweight and older participants is noted (Stevens et al., 1998). This study was limited to white participants, had one measure of BMI at the outset, and contained numerous exclusions, however, the large number of non-smoking participants who were in good health at the onset was thought to lend certain validity to the results (Stevens et al., 1998, p. 7).

An examination of choices made by individuals and how well they maintained health behaviors relating to cardiovascular disease, diabetes, hypertension, high cholesterol, (D. E. King, Mainous III, Carnemolla, & Everett, 2009) compared data from the National Health and Nutrition Examination Survey (NHANES) 2001-2006 with data from the 1988-1994 NHANES. The survey results indicated that fewer individual adults between 40 and 74 years of age were maintaining the healthy lifestyle habits in 2006 than did in 1988 study, and that when a minimum of three of the five healthy behaviors had been continued there was a reduction of the incidence of both disease and mortality (D. E. King et al., 2009). The healthy behaviors compared were normal range BMI, leisure time physical activity, not smoking, abstaining from drinking alcohol or drinking moderately, eating 5 or more servings per day of fruits and vegetables (D. E. King et al., 2009).

Loef and Walach (2012) presented the results of a meta-analysis examining the effects of combined health behaviors and posited that mortality could be reduced by as much as 66% if individuals would practice healthy lifestyle specifically by avoiding

smoking, moderation in alcohol use, maintenance of normal range weight through healthy diet and exercising regularly. This assertion has been supported by research that confirmed a lower risk of heart failure among 40 year old men when they followed habits of not smoking, moderate alcohol use, maintained normal weight, ate a healthy diet and regularly exercised (Djoussé, Driver, & Gaziano, 2009). Among overweight and obese individuals over 21 years of age, practice of four or more healthy habits were found in 11,761 participants to be associated with lowered mortality risk of individuals of any level BMI (Matheson, King, & Everett, 2012). Findings of a cross-sectional study with 1196 participants age 45 and older also supported a relationship between healthy behaviors, a reduction or prevention of disease and mortality (Fortin et al., 2014). Fortin et al. (2014, p. 686) did note that BMI at either extreme of the spectrum was associated with multi-morbidity or “the co-occurrence of multiple long-term or chronic diseases in one individual.”

A recent study focused on obesity, BMI and risk for morbidity and mortality using the data from National Health and Nutrition Examination Survey 1988-1994 finding that among participants (aged 18 years and older) who were underweight, overweight or obese the incidence of death increased and the increased risk of mortality remained after controlling for age, gender, race, and education (Borrell & Samuel, 2014). Borrell and Samuel (2014) described the shortening of life by up to five years in overweight or obese individuals who were between 45 and 64 years of age depending upon the individual’s level of obesity. The importance here is directly related to the burden which is borne by society for the direct costs of treatment and the indirect costs

associated with loss of life related to diseases that are associated with obesity. With respect to coronary heart disease, weight loss programs have been seen to be a beneficial treatment (Lavie, Milani, Artham, Patel, & Ventura, 2009).

Deng, Castelli, Castro-Pinero, and Guan (2011) conducted a survey at a southern state university to examine student BMI and physical activity in comparison to the objectives of *Healthy Campus 2010* (American College Health Association, 2002). Results of this study indicated that the participants did not meet the stated objectives, BMI and physical activity did not change significantly but did vary with number of years in the university so that the BMI of first year students showed 69.36% were at normal weight and 14.81% were overweight while the fifth year students showed 63.98% were at normal weight and 24.55% were overweight (Deng et al., 2011). Physical activity engaged in at either moderate or vigorous levels for at least three days per week did not reach significance between groups but did indicate slightly more of the normal or desired weight students did meet that objective (Deng et al., 2011). Suggestions are presented relating to interventions to increase healthy lifestyle habits.

The risk of the development of chronic disease associated with overweight and obesity were documented as the costs for health care. The improvement of health with weight loss has been the subject of extensive research. Significant improvement in total cholesterol, triglycerides and high-sensitive C-reactive protein occurred with as little as five percent weight loss, and when augmented by exercise the results were achieved in fewer days (Fayh, Lopes, da Silva, Reischak-Oliveira, & Friedman, 2013). Similar positive results of reversal of poor health and have shown substantial improvement in

cardiovascular disease with significant weight loss (Alpert, Omran, Mehra, & Ardhanari, 2014).

The most common method of measurement of body fat is BMI. There is support for the self-reported measurements of height and weight used to calculate the BMI, however it was noted that there exists a possible need for corrections to adjust for biases that may be present (Stommel & Schoenborn, 2009). Recent research described the merits of other methods to measure body fat and indicated the complexity of a “perfect” method of measurement for all ethnicities to accurately determine excess body fat. The methods included the body adiposity index, also known as waist-hip ratio, bioimpedance analysis, air displacement plethysmography and dual energy X-ray absorptiometry (Geliebter, Atalayer, Flancbaum, & Gibson, 2013; Suchanek et al., 2012). There was agreement between these studies that body adiposity index was not “universally valid” due to body composition differences that naturally occur with age, to the location of excess body fat and the likelihood of error in measurement of hips (Suchanek et al., 2012, p. 80). Geliebter et al. (2013) examined the body adiposity index and BMI in comparison with bioimpedance analysis, air displacement plethysmography and X-ray absorptiometry in clinically obese women. Although the sample for this study was small ($n = 19$), the regression analysis determined the BMI performed better at assessing body fat than did body adiposity index in clinically obese women (Geliebter et al., 2013).

A study conducted with Mexican American participants ($n = 698$) examined BMI and body adiposity index to determine whether there was a difference between these measures and cardiometabolic risk factors and whether one measure provided a better

method for identifying percent of body fat (Lichtash et al., 2013). Results indicated greater correlations with all measured cardiometabolic risk factors and BMI than with body adiposity index (Lichtash et al., 2013). BMI is described as “an imperfect measure of body adiposity” partially due to the lack of differentiation between muscle and fat, with a greater correlation to body fat percentage seen with body adiposity index (Lichtash et al., 2013). The best measure of body fat percentage may yet be discovered, and this controversy settled with further research.

In summary, the overweight and obesity research has not examined online health psychology graduate student likelihood of meeting or exceeding the objectives of Healthy People 2010 or Healthy People 2020 (CDC, 2013, n. d.). The importance of modeling healthy lifestyle components such as maintaining weight within a normal range was noted with regard to patient’s perception of physician credibility and likelihood of patients following an obese physician’s advice regarding weight management (Puhl et al., 2013). Similar results have been shown with physical therapists recommendations relating to physical activity if they are not engaging in physical activity themselves (Chevan & Haskvitz, 2010).

Research has been predominantly conducted using quantitative designs to examine who is overweight, obese, or morbidly obese. The area where controversy has arisen relates to the measurement used to determine obesity whether it be BMI or body adiposity index (Geliebter et al., 2013; Lichtash et al., 2013), although the most commonly used measure remains BMI based on self-reported height and weight measurements. Overweight and obesity have been commonly measured using self-

reported inches or metric equivalents of weight and height needed for the BMI to be calculated. Schoenborn et al. (2013) noted that overweight and obesity are more likely to be under-reported as are other harmful behaviors while more positive behaviors may be over-reported. The present static group comparison quasi-experimental design research followed a survey methodology with similar questions to those used by Schoenborn et al. (2013) where measurements of height and weight were provided by self-report.

Alcohol Use

Schoenborn et al. (2013, p. 5) followed public health concerns relating to regular drinking and “episodic heavy drinking and binge drinking” behaviors which are associated with significant health risks. The heavy drinking definition differs between men and women with men who drink over 14 drinks per week and women who drink more than seven drinks per week being designated as heavy drinkers (Schoenborn et al., 2013). Different definitions were applied to binge drinking for women and for men. The definition of binge drinking was based on an observed increase in the blood alcohol level to 0.08 g/dL which was observed in a woman after she consumed four drinks or a man after he consumed five drinks within a two-hour period (National Institute on Alcohol Abuse and Alcoholism, 2013). Nearly 65% of adults in the United States were described as current drinkers and about 21.0% lifetime abstainers (Schoenborn et al., 2013).

The adults who were current drinkers were broken into categories of heavy, moderate, light, infrequent, and never (Schoenborn et al., 2013). It was noted that while some health benefits may be conveyed by one or two drinks in a day heavier amounts of alcohol carry a significant potential for harmful risks (Schoenborn et al., 2013). Men

were identified as more likely to be current drinkers than were women (70.8% versus 59.5%), as well as to drink more heavily (Schoenborn et al., 2013). Current light to moderate drinking in adults increased with income so that individuals whose income was below the poverty level were less likely to be seen in the heavy drinker category than were the highest family income level (Schoenborn et al., 2013). Similarly, those who attained graduate degrees were more likely to be current drinkers than those who achieved a high school diploma, a GED, or less (Schoenborn et al., 2013).

The percentage of individuals having more than five drinks in a day on one occasion in the past year (heavy drinking) decreases from 35.1% for the ages 18 to 24 years to 2.3% for the ages over 75 years (Schoenborn et al., 2013). Racially, 67.8% of Caucasian, 52.5% of Black or African American, 56.4% of American Indian or Alaska Native, 48.0% of Asian, 45.5 % of Native Hawaiian or other Pacific Islander adults, 66.6% of non-Hispanic and 54.4% of Hispanic adults were found to be current drinkers (Schoenborn et al., 2013).

The marital status designations were identified as never married, widowed, married, cohabiting, divorced or separated, with the greater incidence of individuals who never drank being among the never married and widowed adults (Schoenborn et al., 2013). The heaviest drinkers were found with cohabiting, divorced or separated individuals (Schoenborn et al., 2013). The incidence of individuals who were lifetime abstainers was highest in the Southern states and in large metropolitan service areas (Schoenborn et al., 2013).

The individual who was most likely to practice a healthy lifestyle with light to moderate alcohol use would be female, Asian, over 45 years of age, have an income between poverty level and four times the poverty level, would not have a graduate degree and would be a widow living in a Southern large metropolitan service area (Schoenborn et al., 2013). The amount of alcohol consumed per day would be one drink and seven or less drinks per week (Schoenborn et al., 2013). The present study was concerned with the comparison of drinking patterns of online health psychology graduate students to online non-health psychology graduate students who are over 18 years of age, who are likely to be part of a family group, be employed and thus present different sample characteristics than previously examined.

Research has contributed to the understanding of risk factors of undergraduate students aged 18 to 24 to engage in heavy or binge drinking and has described the causal or contributing factors of these alcohol-related behaviors. The major negative outcomes of college drinking were associated with accidents both in and out of automobiles and subsequent disability or death, alcohol poisoning, sexual assault or abuse, academic problems, mental or physical health problems, blackouts and suicide (National Institute on Alcohol Abuse and Alcoholism, 2013). The use of alcohol by online health psychology graduate students has not been examined although some studies have focused on graduate students in other health-related disciplines in traditional settings. Research has examined drug and alcohol use among both undergraduate and graduate college students although most of this research does not separate student level of enrollment

during statistical analysis (Barry, Whiteman, Piazza-Gardner, & Jensen, 2013; Lanier, Nicholson, & Duncan, 2001).

Data in the literature related to online health psychology graduate students is very sparse so studies that used other professional health program graduate level student participants were included. Some examples of professional health disciplines other than health psychology are physical therapy, nursing, medicine and pharmacology. Alcohol-related attitudes and behaviors among graduate students in the health professions are significant because habitual behavior patterns may influence how and when the practitioner approaches client or patient problems relating to alcohol. Those same attitudes may influence when the professional would provide or refer the client or patient to counseling (Frank, Elon, Naimi, & Brewer, 2008). Using a questionnaire, data was obtained from medical students in their first year, their third year and again in their fourth year of study enrolled in 16 medical schools in the United States (Frank et al., 2008). Student drinking patterns did not exhibit change between first and fourth years of study (Frank et al., 2008). Among students pursuing a primary care practice, alcohol counseling was seen to be important by first-year students as a treatment for individuals who were having alcohol-related problems, but by the fourth year only 28% of students described this treatment as valuable (Frank et al., 2008). Whether the interest in counseling as an intervention for alcohol-related problems is less likely to be considered as students gain training in the use of counseling or whether the student did not perceive any significant problem behavior present needs further research to determine what reasons are involved.

A recent study from Finland was included as relevant and comparable to United States college students in the health sciences. In studying the incidence of problem drinking among medical students in Finland (Ketoja, Svidkovski, Heinälä, & Seppä, 2013) it was found that the occurrence of problem drinking varied with the version of the Alcohol Use Disorders Identification Test (AUDIT) questionnaire developed by Saunders, Aasland, Babor, de la Fuente, and Grant (1993). In addition, the short form of AUDIT-3 was found to be a reliable screening tool for risky drinking behaviors in males but not for females (Ketoja et al., 2013). Additional findings from this study were supportive of previous research which indicated that females tend to engage in binge and heavy drinking less than males, although those females that do engage in binge and heavy drinking early in their college studies significantly decrease such behavior as they progress through the program of study (Ketoja et al., 2013).

Among first year through third year doctor of pharmacy students at Auburn University in Alabama, the alcohol use behaviors measured with AUDIT (Saunders et al., 1993) indicated that high risk drinking behaviors were engaged in by 23.2% of students (Oliver, McGuffey, Westrick, Jungnickel, & Correia, 2014). As noted in other research, male students were more likely to engage in high risk binge and heavy drinking (Oliver et al., 2014). Likelihood of engagement in risky drinking was provided by drinking motives related to enhancement and coping, while conformity and social motives were not significantly associated with binge and heavy drinking (Oliver et al., 2014). Using the same alcohol survey (AUDIT) with a group of participants from nine pharmacy schools, Oliver et al. (2014) supported results obtained by English, Rey, and Schlesselman (2011).

The findings indicated that more than one-quarter of all pharmacy students scored in the hazardous range on AUDIT, which indicated a high likelihood of risky drinking. Further, the single, male student without children at the first or second year level in the pharmacy doctoral program was the most likely to exhibit indicators of harmful alcohol use (English et al., 2011).

Binge drinking has been the focus of a great deal of research relating to the drinking college student. Chavez, Nelson, Naimi, and Brewer (2011) evaluated Behavioral Risk Factor Surveillance System data to examine estimates for women noting that the change in definition from ≥ 5 drinks per two hour period to ≥ 4 drinks per two hour period was helpful in identifying more women who were at risk. The authors state that although the behavior of the females had not changed, more females were identified as being involved in risky drinking practices associated with binge drinking because of the changes in the definition of binge drinking (Chavez et al., 2011).

Heavy episodic drinking may lead to an increase in the likelihood of experiencing an alcohol-related problem a few of which are black-outs, injuries or academic impairment (Lienemann & Lamb, 2013, p. 73). In a study which was designed to examine factors that would predict heavy episodic drinking in college females Lienemann and Lamb (2013) applied both logistic and linear regression statistics to data obtained from scores from the Comprehensive Effects of Alcohol, Cognitive Appraisal of Risky Events, and Drinking Context Convivial Drinking scales. Additional data examined by Lienemann and Lamb (2013) included self-efficacy scores, a description of alcohol use and its frequency, as well as demographic information from southern

California undergraduate female students (n = 95). The findings of this study indicated that participants who exhibited high expectancy of positive effects from alcohol were more likely to engage in heavy episodic drinking than those who expected negative effects (Lienemann & Lamb, 2013). The results further indicated that the expectancy of positive consequences of engaging in risky behaviors while drinking was found to differentiate between the non-heavy episodic drinkers and the heavy episodic drinkers but not between those expecting negative consequences from engaging in risky behaviors (Lienemann & Lamb, 2013).

Lienemann and Lamb (2013) also examined self-efficacy and findings suggested a relationship of higher self-efficacy and greater ability to refuse drinking and engaging in risky behaviors related to alcohol use while lower self-efficacy was indicative of heavy episodic drinking in participants. Limitations to study noted the small sample size, measures used particularly to determine self-efficacy were not validated, and all participants from small on-campus residence colleges where drinking was allowed and perhaps encouraged to facilitate socialization (Lienemann & Lamb, 2013).

The foregoing research focused on the relationship of binge and heavy episodic drinking of alcohol behaviors among college students and the consequences observed. Changes in the behaviors associated with the consumption of alcohol have been suggested such as increasing the efforts required of students to accomplish academic requirements (Butler, Spencer, & Dodge, 2011) or increasing individual self-efficacy to increase the student's ability to refuse drinking to excess (Lienemann & Lamb, 2013). Further suggestions were to engage in better screening and counseling by healthcare

professionals as well as improvements in parental guidance and behaviors related to alcohol (Stahre, Roeber, Kanny, Brewer, & Zhang, 2014). Further study will be required to determine the ability of these measures to avoid establishment of or instigate the reversal of alcohol related behaviors. Alcohol use in terms of binge drinking and heavy episodic drinking has been described as responsible for about “88,000 deaths per year from 2006-2010, and accounted for 1 in 10 of all deaths among working age adults ages 20-64” (Stahre et al., 2014). The costs associated with disease, death and lost years of life clearly highlight the need to find and implement effective means to reduce the harm to individuals and to society caused by excessive alcohol consumption.

Most of the research regarding alcohol consumption included here has examined secondary data, used a mailed or an on-line questionnaire either alone or with additional tests. As noted previously the self-reported use of alcohol may not be accurate. Most of the data was statistically analyzed to obtain odds ratios between alcohol use and demographic data. The most common quantitative statistical analyses used were the chi-square or t-tests, although where applicable multivariate statistics were used such as multiple logistic regression analysis.

Alcohol use research has not examined the likelihood of online health psychology graduate student meeting or exceeding the objectives of Healthy People 2010 or Healthy People 2020 (CDC, 2013, n. d.). The research reviewed examined participants who are undergraduate college students, although some research included graduate students, they did not present data separated by level of study. Medical school students in their first through fourth year were differentiated with the first year students more likely to discuss

options for alcohol-related problem counseling with their patients than fourth year students (Frank et al., 2008). Reduction of use of alcohol prior to tests or other important events was noted among undergraduate students (Butler, Dodge, & Faurote, 2010; Butler et al., 2011). Similar results of reduced alcohol consumption were found to occur among pharmacology students (English et al., 2011; Oliver et al., 2014). The importance of the research for the online health psychology graduate student is the need to engage in appropriate health behavior by either abstaining from drinking alcohol or to drink responsibly within the objectives noted.

Research involving the consumption of alcohol used quantitative design and relied upon self-reported data whether with a questionnaire, maintaining a journal of alcohol consumption or emailing a daily report of what alcohol was consumed the previous night. Although each method relies on self-reports of consumed alcohol, there appears to be consensus among researchers regarding the adequacy of this method of acquiring the data.

Many of the studies presented here used very large samples, something that would strengthen the findings and increase the ability to generalize from the results. In some studies the use of a longitudinal within-subject design provided greater strength to the results. The sample demographics of many of the studies presented here were largely Caucasian students at small, private universities that may have presented differing results from a multi-ethnic sample at a state university. These results would not be appropriately generalized to other ethnicities without further study. The use of an in-person questionnaire versus an online questionnaire does not appear to yield substantially

different results. An additional daily check-in via email to obtain answers to questions related to quantities of alcohol consumed the night before has been used as well as qualitative questions to provide greater accuracy when there is a need to recall quantities of drinking behavior.

Cigarette Smoking

An investigation was conducted to update data-gathering methods used to estimate the number of smoking-related deaths found that although cigarette smoking led to fewer deaths than had been previously estimated it remained “the leading cause of preventable mortality in the United States” (Rostron, 2013, p. 238). A recent article expanded evidence regarding smoking related chronic obstructive pulmonary disease in finding that when the cause of death was included in morbidity statistics the number of related deaths was found to be higher due to more accurate reporting (Rostron, Chang, & Pechacek, 2014). In 2009, the number of individuals diagnosed with chronic obstructive pulmonary disease and other diseases designated as attributable to cigarette smoking which included diabetes mellitus, heart attack, various cancers including lung cancer and stroke has been found to be greater than 14 million people (Rostron et al., 2014). Costs associated with treatment of chronic diseases and the loss of functionality and life associated with cigarette smoking were very high (CDC, 2013). It has been over 50 years since the United States Surgeon General (1979) warned against the potential harmful effects of cigarette smoking. At that time tobacco control programs started to become a part of communities and those programs have had a significant influence on reducing the

numbers of smokers (CDC, 2007). An updated version of this report has been produced by CDC (2014c).

Data from the 2008-2010 interviews indicate that 58% of adults in the United States never smoked cigarettes, while about 20% of adults currently smoked and 21% were former smokers (Schoenborn et al., 2013). Of those who were identified as current smokers, only 15.8% indicated that they smoked daily while 4.4% smoked less than daily (Schoenborn et al., 2013). Information obtained regarding cigarette smoking included the number of attempts to quit, number of cigarettes smoked, frequency of smoking, and when the individual started smoking (Schoenborn et al., 2013).

Females were found to be less likely than males to smoke over 30 cigarettes per day or to have commenced smoking before they were 16 years of age and currently be smokers (Schoenborn et al., 2013). Females were more likely than males to have started smoking after reaching 21 years of age (Schoenborn et al., 2013). The greatest number of current smokers of both genders was found to be within the age range of 25 to 44 years (Schoenborn et al., 2013). The percentages of current smokers who were between 45 and 74 years of age and had attempted to quit in the prior year varied between 40.5% and 42.6% (Schoenborn et al., 2013). Findings further indicated that 53.3% of the 18 to 24 age group had attempted to quit the prior year while only about 30% of the older daily smokers over 75 years of age had attempted to quit the prior year (Schoenborn et al., 2013).

Ethnicity revealed differences in likelihood of being a current smoker with non-Hispanic whites more likely to smoke than Hispanic blacks although black adults were

more likely than white adults, American Indian or Alaska Native smokers to have commenced smoking before they were 21 years of age (Schoenborn et al., 2013). Asian adults were less likely to be current smokers than were Alaska Native or American Indian, white or black adults (Schoenborn et al., 2013). The level of education achieved mirrored the level of income with the lower levels of both measures being associated with smoking cigarettes (Schoenborn et al., 2013). Cohabiting, divorced or separated adults were more likely to be current smokers than married adults (Schoenborn et al., 2013).

Smokers who reside in a rural or suburban area were more likely to smoke slightly more cigarettes on average than did current smokers who live in small or large metropolitan areas and were less likely to have attempted to quit smoking within the past year (Schoenborn et al., 2013). The geographic regions containing the largest number of current smokers were the midwestern and southern United States, while individuals in the west and northeast were least likely to be current smokers (Schoenborn et al., 2013). Continued tobacco use among adults in the United States thus has been described as conforming to differing patterns across states and among racial/ethnic subgroups (B. A. King, Dube, & Tynan, 2012).

The individual who practiced the healthy lifestyle component of not smoking cigarettes would be a single race Asian female whose income is four times poverty level or more, and who has a graduate degree (Schoenborn et al., 2013). This woman would be either married or never married, living in the Western United States in a large metropolitan area (Schoenborn et al., 2013).

The majority of recent research related to cigarette smoking and college students has examined whether there is a dependency on tobacco and the frequency of smoking whether daily, weekly or only in social situations where alcohol was consumed (Caldeira et al., 2012; Halperin, Smith, Heiligenstein, Brown, & Fleming, 2010; Sutfin et al., 2012). Descriptions of what intervention opportunities were described and were based upon the incidence of dependency and frequency of cigarette smoking (B. A. King et al., 2012; D. E. King et al., 2009; Troost, Rafferty, Luo, & Reeves, 2012). Research has also examined the age of onset of smoking in adolescents and college age individuals (Troost et al., 2012). The importance of national and community tobacco control programs, counseling and interventions was described as likely to further decrease the numbers of smokers to coincide with the objectives of Healthy People 2020 (CDC, 2013). Benefits of smoking cessation and of never commencing to smoke include the lowered death rate, the lowered incidence of various heart, circulatory, respiratory or other disease that have been found to be caused by smoking (Holford et al., 2014; Jha et al., 2013).

At what age the individual cigarette smoker stops smoking was described as the determinant of a benefit that may be obtained from no longer smoking (Jha et al., 2013). “Cessation of smoking . . . before the age of 40 years, and preferably much earlier, will reduce by about 90% the decade of life that is lost from continued smoking” (Jha et al., 2013, p. 249). Findings from this study indicated that individuals who quit smoking prior to age 34 could gain an estimated 10 years, while those who waited until age 54 would gain only six years of life (Jha et al., 2013). The data was obtained from the United States National Health Interview Survey (Schiller, Lucas, Ward, & Peregoy, 2012). The

length of life of individuals who continued to smoke were compared with those who quit smoking or had never smoked to determine the extension to life provided by not smoking (Jha et al., 2013). The effects of healthy lifestyle behaviors have been shown to be associated with added years of life and improved quality of life, although there have been trade-offs between smoking less and increased obesity (Jha et al., 2013; Loef & Walach, 2012; Troost et al., 2012).

The research that has focused on college students has generally not examined smoking behaviors among graduate students either in an online or traditional setting. The literature search did not produce any articles relating to online or traditional graduate students who were studying health psychology, something that appears to be a significant gap in the literature. Many tobacco control measures were maintained in the community or on a brick-and-mortar campus by prohibiting smoking except in designated areas or off campus.

Research into the patterns of smoking engaged in among college students at traditional universities have noted that while 25 to 30% of students describe themselves as current smokers, 70 to 80% of those students do not smoke daily (Halperin et al., 2010; Sutfin et al., 2012). Each of these studies presented new information. Sutfin et al. (2012, pp. 222-223) reported that compared to students who smoked regularly, students who did not smoke on a daily basis were more likely to belong to a fraternity or sorority, to have a mother who had attended college, to be younger and to attend a private university or college. Sutfin et al. (2012) expanded knowledge presented in previous research that related to nondaily smokers. Although nondaily smokers were found to be

less likely than daily smokers to engage in health risk behavior relating to illicit drug use, they did engage in other risky behaviors and their long-term risk of disease was greater than non-smokers. Sutfin et al. (2012) replicated the finding that any amount of smoking was associated with engaging in other risky behaviors such as binge drinking, driving recklessly and using emergency rooms for treatment (Halperin et al., 2010).

The research regarding tobacco and college students represents analysis of self-reported data obtained by either telephone interview, questionnaires either mailed to the participant or completed online or application of data analysis to secondary data obtained from major studies that have been conducted such as CDC's Behavioral Risk Factor Surveillance System (2014b). As such, most of this research represents the analysis of self-reported data obtained through telephone interviews that is unverified and unverifiable. Most of these studies were quantitative in design representing data obtained from participants who answered a survey or a questionnaire. The major difficulty reported relating to cigarette smoking data is that it is unverifiable due to its being self-reported.

Cigarette smoking has not been the subject of research among online health psychology graduate students related to the likelihood of meeting or exceeding the smoking objectives of Healthy People 2010 or Healthy People 2020 (American College Health Association, 2002; CDC, 2013; n. d.). Undergraduate students have been studied with the intent of finding effective methods of intervention. Although the incidence of smoking and of dependency has reduced significantly since the report of the United States Surgeon General (1979), it has been suggested that with greater emphasis on

tobacco control programs, assistance through counseling and intervention would reduce smoking cigarettes even further. There have been positive indications that the college smokers are less dependent on cigarettes and smoke with less frequency than in previous years (Caldeira et al., 2012; Sutfin et al., 2012).

Summary

The major themes addressed in the literature have related to a need to increase sleep hygiene and knowledge of it in the populace, to increase physical activity in all age groups, to decrease obesity, to decrease or discontinue binge and heavy episodic drinking, and to decrease or discontinue smoking of cigarettes. These themes focused upon the connection of self-controlled voluntary behaviors that are risk factors for increased incidence of disease and subsequent early death, the consequential costs for health care and the potential interventions to avoid the negative consequences. Health psychologists may represent a significant force to influence the public by increasing awareness of healthy principles and behaviors through employment as professional administrators, teachers, counselors, or other public or private health care providers.

Although the importance of the health care providers modeling such behaviors has been studied in physicians and physical therapists (Chevan & Haskvitz, 2010; Frank et al., 2000; Puhl et al., 2013), research has not examined the degree to which health psychology graduate students from online or traditional programs accept health behaviors into their own lives. Health psychology graduate students represent a professional group of individuals whose academic or counseling area of expertise is the importance of health behaviors in aiding in the long-term maintenance of good health.

The study of health practices among health psychology graduate students whether online or in traditional college settings has been overlooked. The present research addresses this gap in the literature regarding the health practices of online health psychology graduate students and how well they meet Healthy People 2020 objectives. The health behaviors of online health psychology graduate students were compared with online graduate students enrolled in other programs at the same university. The present static group comparison quasi-experimental design study examined whether online health psychology graduate students differ in the engagement in health behaviors from online graduate students in other programs. Additional insights were obtained through the comparison of test scores of self-efficacy (Bandura, 1977) and of autonomy, competency, and relatedness (Ng et al., 2012). These scores may be predictive of meeting behavioral objectives of Healthy People 2020 (CDC, 2013) and may indicate who is more likely to engage in healthy behaviors and thus present a positive model for health. The design and methodology used in this study have been fully described in Chapter 3.

Chapter 3: Research Method

Introduction

The purpose of this static group comparison quasi-experimental design study was to examine health behaviors and identify whether certain concepts are associated with engaging in those health behaviors. Two groups of online graduate students health behaviors were examined: health psychology graduate students who have been exposed to health psychology graduate curriculum and graduate students enrolled in other programs. Participant demographics, graduate program in which the student is enrolled, length of enrollment, and health behaviors were gathered to determine whether these were related to engagement in health behaviors identified by Healthy People 2020 (CDC, 2013). Specific areas examined were BMI and health behaviors of sleep, alcohol and tobacco use, and aerobic and muscle strengthening leisure time physical exercise.

In addition to questions in an online survey regarding demographics and health, The Generalized Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) and Basic Need Satisfaction in General Scale (Deci & Ryan, 2015) were included in the survey to explore the strength of general perceived self-efficacy, autonomy, competence, and relatedness as constructs associated with online graduate students adopting health behaviors. The Social Desirability Scale-17 (Stöber, 2001) was also included in the survey to assess the likelihood of bias in response. The intent of using a descriptive approach in this research was to obtain preliminary information regarding health behaviors engaged in by online health psychology graduate students compared with online graduate students in other areas of study.

This chapter includes a description of the research design and why it was chosen as well as the methodology that was used in this study as well as a description of the population from which participants were recruited, sampling procedures, how the participants were recruited, and data collected. Criteria for inclusion of participants and sample size determination were included in this chapter. A description of test instruments was included. The methodology for both a pilot study and the main study were presented along with a description of the statistical analyses used with results from the main study. Possible threats to validity and ethical procedures are described.

Research Design and Rationale

Research Design

The design for the present study is a static group comparison quasi-experimental study (Campbell & Stanley, 1963). This design is nonexperimental in that the researcher does not manipulate the independent variables and random assignment to groups is lacking. This design was chosen to obtain information regarding the health behaviors of health psychology graduate students, a group that has not been studied previously. The health behaviors of this group of online health psychology graduate students was compared with a group of online graduate students in other programs. The difference examined was whether the graduate study of health psychology led to improved health behavior. The categorical independent variables were the graduate program in which participants were enrolled (1 = health psych, 2 = other program). The scores obtained for general perceived self-efficacy and autonomy, competence, and relatedness are continuous dependent variables while four of the health behaviors (average hours of

sleep, leisure time physical activity, alcohol use, and cigarette smoking) were dependent categorical variables. BMI (calculated from height and weight) was a dependent continuous variable. Survey questions were self-reported answers to health related questions adapted for use in an online survey from questions used by the National Health Interview Survey in 2010 (Schiller et al., 2012). Self-reported health behaviors may provide evidence of the internalization of learned knowledge of those behaviors as suggested by Deci and Ryan (1985). Participant results were also compared to recommended objectives described on the Healthy People 2020 website (2013).

Demographic information was obtained and included background data regarding age, gender, ethnicity, graduate program, and whether the graduate student in health psychology has taken the course entitled Stress and Coping (required at master's and doctoral levels and generally taken in the first year). Other questions address length of time in the online program, location and environment of residence, degrees obtained such as bachelor of arts or bachelor of science degree, masters, doctorate or medical degree, and previous or current employment in the healthcare field. The online classes will have participants who are familiar with using computers to take online tests, which will contribute to feeling at ease in an online environment.

Research Questions and Hypotheses

The following research questions and hypotheses are reproduced from Chapter 1. The intent of the research questions was to obtain information regarding health practices among the sample and determine whether they met Healthy People 2020 objectives to help to reduce the gap in the literature.

RQ1: Do demographic variables (gender, race, age, marital status, geographical area, place of residence, and employment) explain differences in maintaining normal range BMI and engagement in health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, light to moderate intensity, and muscle strengthening with weights and/or calisthenics)?

H₀1: There are no significant differences in maintaining a normal range BMI and engagement in health behaviors by demographic characteristics of the sample.

H_a1: There are significant differences in maintaining a normal range BMI and engagement in health behaviors by demographic characteristics of the sample.

RQ2: Is there a difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity or light to moderate intensity, and of muscle strengthening with weights and/or calisthenics) as categorized according to CDC recommended guidelines?

H₀2: There is no significant difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, or light to moderate intensity, and of muscle strengthening with weights and/or calisthenics) as categorized according to CDC recommended guidelines.

H_a2: There is a significant difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, or light to moderate intensity, and muscle strengthening with weights and calisthenics) as categorized according to CDC recommended guidelines.

RQ3: Do mean scores from tests of theory concepts of general perceived self-efficacy, autonomy, competence, or relatedness differ between online health psychology graduate students and online graduate students from other programs?

H₀3: There are no significant differences between mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness between online health psychology graduate students and online graduate students from other programs.

H_a3: There are significant differences between mean scores from tests of general perceived self-efficacy, autonomy, relatedness, and competence between online health psychology graduate students and online graduate students from other programs.

RQ4a: Is there a correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness?

H₀4a: There is no significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

H_a4a: There is a significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

RQ4b: How well do the set of predictor variables (mean test scores on self-efficacy, autonomy, competence, and relatedness) predict engagement in health behaviors to the level categorized according to CDC recommended guidelines?

H₀4b : Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do not predict or explain engagement in health behaviors to the level categorized according to CDC recommended guidelines.

H_a4b: Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do predict or explain engagement in health behaviors to the level categorized according to CDC recommended guidelines.

RQ5: Is there a difference in mean test scores for social desirability bias between students in online health psychology graduate programs and students enrolled in other graduate programs?

H₀5: There is no significant difference between mean test scores for bias between online health psychology graduate students and students in other graduate programs.

H_a5: There is a significant difference between mean test scores for bias between online health psychology graduate students and students in other graduate programs.

Rationale for Using a Quantitative Design

The purpose of this static group comparison quasi-experimental design study was to examine health behaviors and identify whether certain concepts were associated with engaging in those health behaviors among online health psychology graduate students (group exposed to health psychology graduate curriculum) and compare with data from online graduate students enrolled in other programs. The health behaviors compared are

sufficient sleep, physical activity, BMI, smoking tobacco cigarettes, and alcohol use as defined by CDC (see Healthy People 2020). Test instruments were used to assess general perceived self-efficacy, autonomy, competence, and relatedness to determine whether any of these theoretical concepts were predictive of the engagement in health behaviors by either group of graduate students. Social desirability was also tested. The health psychology graduate student population have not been studied. Research has focused on healthcare workers although it has not included health psychology participants. This research has concentrated on medical doctors (Frank et al., 2000; Helfand & Mukamal, 2013; Lobelo et al., 2009; Oberg & Frank, 2009; Puhl et al., 2013) and physical therapists (Black et al., 2012; Chevan & Haskvitz, 2010). This research noted in part that healthcare worker credibility was directly related to the modeling of healthy behaviors particularly when counseling patients or clients regarding health practices.

The design provides for the examination of the health behaviors that participants may be integrating into their lives, and how the online health psychology graduate students compared to online graduate students enrolled in other programs in engaging in health behaviors. Demographic and quantitative data were obtained from participant self-reported responses to survey questions related to specific demographic categories (see Appendix A). BMI and health behaviors of sleep, leisure-time physical activity, alcohol and tobacco usage were examined from online health psychology graduate students to see if they differ from online graduate students enrolled in other programs. Data from online health psychology graduate students and online graduate students from other programs was examined to determine whether participants' engaging in health behaviors was

predicted by theoretical concepts of general perceived self-efficacy, autonomy, competence, or relatedness scores and if the two groups of participants differ in meeting behavioral objectives described by Healthy People 2020 (CDC, 2013), an abbreviated list of objectives was included in Appendix B.

Methodology

Participant Selection and Sampling Method

A pilot study was conducted with six participants invited using a recruitment ad placed on social media. The purpose for this pilot study was to identify any potential problems such as unclear questions or instructions, and to determine an average time required to complete the survey. After the pilot study was completed, a recruitment ad was placed on social media sites to invite graduate students at the large online University to participate in the study. The invitations for the pilot study and for the main study included the criteria for participants to be in the study as well as contact information. Pressing "Next" at the end of the consent form was required to gain access to the survey and was an acknowledgement of having read and understood the consent form.

In addition to placement of recruiting ads on social media, ResearchGate, Lee Stadtlander's blog site, LinkedIn, and the large online university's Participant Pool were used. The number of online graduate students registered in the large online university's Participant Pool and the number of online graduate students who are signed up for social media is unknown. Each website was a potential source for recruiting participants.

Criteria for Inclusion of Participants

Participants were students who are currently enrolled in a large online University graduate program (health psychology or other graduate program), who reviewed and signed an Informed Consent letter by clicking “next,” lived in the United States, and were 18 years of age or older. Participants were directed to the SurveyMonkey site of this survey either through the large online university’s Participant Pool site or invitations posted on social media websites (Research Gate, Facebook or LinkedIn).

Sample Size

The recommended sample size was obtained using freeware program G*Power and is 300 participants, 150 online health psychology graduate students and 150 online graduate students from other programs. This figure is consistent with the assumptions of $\alpha = .05$, 2-tailed test, and power = .95. After approximately nine months of recruiting, the number of participants was 230. Those who did not complete the survey or had extreme scores were excluded from the study which reduced the sample to 121 online graduate students enrolled at the large online university that were used in the analysis. Twenty-nine of the graduate students were enrolled in Health Psychology graduate program and 92 were enrolled in other graduate programs.

Instrumentation

The SurveyMonkey survey used in both the pilot study and the main study included a demographic section, health related questions, recognized tests of self-efficacy, autonomy, competency, and relatedness, and a test of social desirability bias. The demographic questions are presented at the beginning of the main survey and ask for

information regarding gender, age, height, weight, race, education including degrees obtained and in what area, years in present program, marital status, geographic region of the United States where they live, type of area where they live, status of employment, employment in a health care field, whether they qualify for disability placard, and financial aid. The next section of the survey used here contained health related questions which were adjusted to be multiple choice or open ended survey questions adapted from the face to face interview questions used in the 2010 questionnaire by Schiller et al. (2012). The Social Desirability Scale-17, The General Self-Efficacy Scale and the Basic Need Satisfaction in General scale were placed after the foregoing demographic and health questions.

The General Perceived Self-Efficacy Scale was made up of 10 items taking approximately two to three minutes to complete. Permission to use this test was granted by Dr. Ralf Schwarzer. Each item had four options that range from “not at all true” (one point value) to “exactly true” (four point value). The scores are added together to obtain the total score. Perceived self-efficacy is associated with a high total score and high self-esteem. Two of the questions in the General Perceived Self-Efficacy Scale are presented here as examples: “I can always manage to solve difficult problems if I try hard enough” and “I can solve most problems if I invest the necessary effort” (Schwarzer & Jerusalem, 1995).

The General Perceived Self-Efficacy Scale has been used to measure the construct of general perceived self-efficacy in over 31 countries and languages with findings of universality (Luszczynska, Scholz, et al., 2005; Scholz, Dona, Sud, & Schwarzer, 2002).

Validity and reliability measures related to this test instrument have been shown to be consistent (Scholz et al., 2002; Schwarzer, Bassler, Kwiatek, Schroder, & Zhang, 1997; Schwarzer & Renner, 2009). Scale reliability has been reported in the United States finding Cronbach's alpha to be .85 with the item means and item total correlations ranging from a low of $r = .52$ and to a high of $r = .69$ (Scholz et al., 2002). More recently, a study confirmed that validity and reliability were consistent with previous results and showed Cronbach's alpha between .79 and .88 with longitudinal stability over 12 and 28 months reported to yield $r = .50$ and $r = .60$, respectively (Romppel et al., 2013). The perceived self-efficacy construct is described by Schwarzer and Jerusalem (1995) as facilitating goal setting, effort investment, persistence in face of barriers, and aiding in recovery from setbacks. The general perceived self-efficacy scale examines perceived self-efficacy that is a broader and more stable response when applied to a specific task across domains when compared to the perceived self-efficacy described by Bandura.

Basic Psychological Needs Scales (Deci & Ryan, 2015) are a group of scales that were developed to assess need satisfaction within various environments. The scale that was used in this study was Basic Need Satisfaction in General (Deci & Ryan, 2015). This scale was made up of 21 items with seven items that address each subscale of needs for competence, autonomy, and relatedness. Permission to use this test was granted by Richard M. Ryan. Each of the items had seven choices for response ranging from "not at all true" to "very true" with the final score requiring the segregation of scores for each of the needs, and then the reversal of some of the score values from positive to negative in

order to obtain the total scores for each need. The score for each of the needs is obtained as an average of the individual scores that relate to that particular need. Two of the questions are presented here as examples of content: “I get along with people I come into contact with” and “People in my life care about me” (Deci & Ryan, 2015).

The Basic Need Satisfaction in General scale has been translated into several languages and studied in other cultures using modified versions to examine job satisfaction, relationship and physical education performance (Deci & Ryan, 2015). Among the United States sample, the alphas were found to be .82 for autonomy, .87 for relatedness and .89 for competence (Chen et al., 2015).

Using an adaptation of Basic Need Satisfaction in General scale which contained seven items for autonomy, eight items for competence and six items for relatedness, Gagné (2003) reported the Cronbach’s alpha for seven items for autonomy to be .69, eight items for competence to be .71, and six items for relatedness to be .86. In a study related to ostracism, Legate, DeHaan, and Ryan (2015) using a modified version of Basic Need Satisfaction in General scale, reported Cronbach’s alpha measures for the subscale of autonomy was .81, competence was .82, and relatedness was .82. These scores are all close to or over the .70 level thought to be an acceptable measure of internal consistency (Osborne, 2013; Pallant, 2013). Divergence between reported Cronbach’s alpha scores may be attributed to different test versions, difference in samples or sample sizes, or the use of fewer than 10 questions on a test such as with each of these subscales (Pallant, 2013). Researchers have found it to be beneficial to average the subscales to obtain a single index of general need satisfaction (Molix & Nichols, 2013). This test was used in

the present study as designed with 21 items and provided information about the internal consistency of the subscales as well as the total test, something which has not been reported in the literature.

The Social Desirability Scale-17 (Stöber, 2001) was used to assess the likelihood of the participants over- or under-stating self-reported responses to health questions. Originally designed to have 17 questions, one question was dropped. The remaining 16 questions were forced choice (true/false), with six of the questions being reverse scored. Thus the possible score range is 0-16 with the higher score indicating more socially desirable behavior bias. The Social Desirability Scale-17 (Stöber, 2001) is based on the Marlowe-Crowne Scale which was originally designed to examine social desirability without psychopathology. The Crowne and Marlowe (1960) scale was modified by Stöber (2001) to modernize the language and remove one question that related to use of drugs. The Social Desirability Scale-17 in Germany exhibited a Cronbach's α of .72 and a four week test-retest correlation of .82 (Stöber, 2001, p. 223). Although noting that further research needs to be done, a study of parametric properties of this scale was performed in the United States and reported finding the scale to be a valid and reliable measure of social desirability bias in both an online and a paper and pencil booklet setting (Blake, Valdiserri, Neuendorf, & Nemeth, 2006).

Health Behavior and Demographic Questions were reproduced from the 2008-2010 National Health Interview Surveys' Sample Adult interview (NHIS, 2016). Since these questions were meant to be used in a computer assisted, face-to-face interview with a trained interviewer, for the present study they were modified to be used in a multiple

choice online survey format. Altering the form of these questions to require the answers to be multiple choice or an open ended fill-in-the-blank may result in change to the responses since there will not be a trained interviewer discussing the health behavior of all family members with one designated family member being interviewed as was done in NHIS (2016). The alteration of the format may lead to several different outcomes including the potential for greater honesty in an online survey due to personal information and privacy. In addition, the participant would not have the option of seeking additional information about a question or the potential answers to questions may include biases since they do not include all possible answers as the NHIS (2016) interview allowed. No information regarding reliability and validity was available on the webpage associated with the NHIS interview questions.

Pilot Study Procedures

After receipt of written approval by the large online university Institutional Review Board (approval number: 04-05-17-0121117), six online health psychology graduate students participated in the pilot study and were invited by use of an invitation placed on social media. The invitation contained a link to the full survey on the SurveyMonkey site. The purpose of this pilot study was to see if the survey instructions and questions were clear, and to obtain an estimate of how long the survey would take on average to complete.

After the pilot participants completed the survey, they were asked to provide a telephone number and time when I can call them. During the interview call, pilot participants were asked for comments on clarity of the survey questions and instructions,

to obtain an estimate of how much time was spent to complete the survey and to provide any further thoughts regarding the survey.

Main Study Procedures

Participants were solicited by placing recruitment ads on social media websites such as Research Gate, LinkedIn, and Lee Stadtlander's blog site. The recruitment invitation provided the participant with the name of the study, some indication of what the study was about, who may participate, an estimated time to complete the survey and the link for the SurveyMonkey website where they may access the survey. The Participant Pool at a large online university was used to recruit participants with a link to the SurveyMonkey website. It was hoped that these methods would increase the likelihood of obtaining the needed sample.

Data Analysis

Changes to questions or instructions were made to improve clarity. The main survey used for data collection had a SurveyMonkey format and was used in both the main study and the pilot study. The survey required that every question be answered. Surveys that were incomplete were not included in the analysis. Many survey questions had an option to decline to answer it. IBM SPSS v. 21 and IBM SPSS v. 25 were used for the statistical analyses. Upon collection the survey data was checked for extreme scores using IBM SPSS v. 21. Extreme scores that appeared to be out of place or may have represented an error also required cleaning due to the potential effect on statistical analysis that may have led to an inference assumption error (Osborne, 2013, p. 141). The method chosen to deal with extreme scores was to remove them from the analysis.

As previously noted, this static group comparison quasi-experimental design study has certain requirements relating to the type of statistic recommended for use. The design lacks random assignment to experimental and control groups; thus these requirements were not met as would be required by many statistics. Included among the types of statistics recommended for use with quasi-experimental research are an independent-samples *t* test, Mann-Whitney *U* test, and one-way ANOVA (Green & Salkind, 2008). However, Tabachnick and Fidell (2014, pp. 34-35) noted that statistical manipulations function in non-experimental or survey research quite well with the exception that causality may not be inferred, only differences. The statistical tests used to analyze this data were independent samples *t*-test, Pearson's Chi-square test, Pearson's product moment correlation coefficient test, one-way ANOVA, multivariate analysis of variance (MANOVA) and binary logistic regression.

With the exception of age and BMI which were both continuous variables, data from selected demographics (e.g., gender, race, marital status, employment, part of United States they live in and whether the participant resides in an urban or rural environment) was coded to be dichotomous and then was analyzed using correlation, Chi-square, and independent samples *t*-tests. The purpose of this analysis was to determine whether specific participant demographics differed in meeting CDC objectives for the specific health behaviors (sufficient sleep, leisure time physical activity, alcohol use, and smoking cigarettes). The CDC objectives are reported on the website for Healthy People 2020 (CDC, 2013) and presented in Appendix B.

Health data of graduate student groups were obtained from answers to health questions used in an online survey. The answers were coded to reflect whether the participant met or did not meet the CDC objectives that created dichotomous variables. The answers were then tested using Chi-square test with four of the health behavior variables (sufficient sleep, leisure time physical activity, responsible drinking, abstain or quit smoking cigarettes). The independent samples *t* test was used to analyze whether the online health psychology graduate students and online graduate students in other programs groups met CDC objectives for BMI within the normal range. One way ANOVA was conducted to explore BMI and race which was divided into three groups (Black/African American, White/Caucasian, and Other Races).

To examine the two student groups for differences in mean scores on self-efficacy test or on test scales for autonomy, competence, and relatedness, the one-way MANOVA was used. Logistic regression was used to determine if the mean scores obtained on self-efficacy, autonomy, relatedness, or competence were predictive of the likelihood of participants engaging in health behaviors to the CDC objective level. Differences in BMI were examined with Pearson's product moment correlation coefficient test. Mean scores for bias obtained from The Social Desirability Scale-17 (Stöber, 2001) were analyzed with one-way ANOVA to determine if there was a difference between the online health psychology graduate students and the online graduate students from other programs in engaging in biased behavior.

Threats to Validity

External and internal threats to validity influence the quality of quantitative data and the conclusions that can be supported (Onwuegbuzie & Johnson, 2006). Threats to external validity of the quantitative data are encompassed by the manner in which the data relates to the general population. The purpose of this static group comparison quasi-experimental design study was to examine health behaviors of online health psychology graduate students (group exposed to health psychology graduate curriculum) and compare with online graduate students from other programs enrolled at a large online University. These are very specific populations and thus the data may not generalize to other groups.

Creswell (2014) listed a number of potential threats to internal validity, most of which do not apply to this research. There may be drop outs or participants who do not finish the survey that represent a threat to the internal validity. Incomplete data, that occurs if a participant drops out of the study before completing his or her survey, was not used.

Construct validity is determined by the strength of the major construct definitions being used. This should not be problematic due to the strength of the specific construct of self-efficacy which has been defined by Bandura (2012), autonomy, competence and relatedness have been defined by Deci and Ryan (2000). The objectives of health behaviors was defined by CDC (2013) and Schoenborn et al. (2013).

Statistical conclusion validity or correct interpretation of the results of a statistical test is increased when the statistic used is appropriate to the sample, the statistic's

assumptions have not been violated, and the power of the test is sufficient to avoid incorrectly assuming the existence of a relationship between test variables when there is none (Fawcett, 2015; Higgins & Straub, 2006). Garcia-Perez (2012) described this type of validity, which along with internal, external, and construct validity was observed to be grounded in the adequacy of analysis of data, appropriateness of test instrument and care to not violate assumptions of the statistical test.

Ethical Considerations

Potential participants received a summary description of this study in the recruitment invitation. The informed consent form was provided with the SurveyMonkey survey as part of the survey introduction for all participants. Additionally, each potential participant was informed of the voluntary and non-deceptive nature of this study when they accessed the survey. At this time, those interested in the study were screened to include people who were enrolled at a large online University as graduate students in a master's or doctoral program, who lived in the United States and who were 18 years of age or older. The need to live in United States and the age requirement were related to comparison of this study's data to published CDC health objectives that were specific to residents of the United States. Access to the main survey was limited to those individuals who agreed to each of these requirements and give their consent. Emphasis was upon the voluntary nature of this study and was indicated in the invitation to participate and the consent form. Data collected from participants was not identified with the individual participant's name but was given a number and no ability remained to access the individual identification data. Data was placed on an encrypted flash drive, stored in

strictly secure manner, and held for a minimum of five years before its destruction. At no time was data able to be traced back to any specific participant as it was stored and analyzed as a group based on specific demographics, data from health questions, and data from tests of general perceived self-efficacy, autonomy, relatedness, and competency and social desirability.

Summary

This chapter provided a description of the methodology of this static comparison quasi-experimental design survey study. Data analysis and collection procedures were addressed including the potential threats to validity and methods that were used to strengthen the integrity of the data. The chapter concluded with ethical concerns and methods to reduce them. Chapter 4 presented the results obtained from the application of this methodology.

Chapter 4: Results

Introduction

The purpose of this static group comparison quasi-experimental design study was to examine health behaviors and identify whether certain concepts were associated with engaging in those health behaviors among online health psychology graduate students (group exposed to health psychology graduate curriculum) and compare with data from online graduate students enrolled in other programs. The entire sample of graduate students were enrolled at the same large online University. Health behavior variables were defined by recommended guidelines and objectives from CDC. The health behavior variables were referred to in this study collectively as health behaviors and were identified as sufficient sleep (obtaining an average of 7 to 8 hours of sleep within 24 hours), tobacco use (not smoking tobacco cigarettes), alcohol use (if drinking, only have one or two drinks in a 24-hour period), BMI (maintain within the normal or healthy BMI range of 18.5 to 24.9), and leisure time physical activity. Leisure time physical activity involves engaging in vigorous intensity aerobic exercise for 75 minutes in a week or light to moderate intensity aerobic exercise of 150 minutes in a week, and two times a week engaging in weightlifting and/or calisthenics to engage all muscle groups. The objectives of health behavior are further defined on the website by CDC Healthy People 2020 (2013). Test results were also examined to see if generalized perceived self-efficacy (Schwarzer & Jerusalem, 1995) and/or basic need satisfaction of autonomy, competency, and relatedness (Deci & Ryan, 1985; Deci & Ryan, 2000; Ng et al., 2012) were related to or predictive of health behaviors of concern in the present study.

Briefly, RQ1 examined whether demographic variables explained any differences in terms of engaging in health behaviors. RQ2 examined whether the graduate student health psychology group and other group differed in terms of engaging in health behaviors according to the CDC. RQ3 examined whether mean test scores for general perceived self-efficacy, autonomy, relatedness, or competence differed for the two graduate student groups. RQ4 examined whether the mean test scores for general perceived self-efficacy, autonomy, relatedness, or competence were predictive or explained engaging in health behaviors. RQ5 examined whether the two groups of graduate students differed in terms of social desirability bias. The research questions were designed to obtain information regarding health behaviors of the sample and fill a gap in the literature related to online health psychology graduate students. Formal research questions and hypotheses associated with them, corresponding analyses, and results are presented later in the chapter.

In this chapter, the pilot study was briefly described. A description of the data collection methods was also presented. After the presentation of results associated with each of the research questions, a summary of the findings was presented and followed by a transition to Chapter 5.

Pilot Study

Six participants completed the SurveyMonkey survey used to collect data in the present study. The pilot study data was used to determine if the survey contained unclear questions or instructions and grammar errors or typos, as well as to obtain an estimated time required to complete the survey. The pilot study survey answers were collected

separately from the main study data and were not included in the main study data analysis. A few corrections to survey questions were made that included the addition of an option to answer smoking questions with “I do not smoke” or to answer the alcohol questions with “I do not drink alcohol”. The optional answer of “none” was added to several questions. The participants tracked the time they needed to complete the survey questions. The reported time required to complete the survey ranged from 10 to 27 minutes, with an average of 12.5 minutes.

Data Collection

Data collection took place over approximately nine months. Locations for recruitment advertisement placement to find graduate students from this large online university increased over the first four months, with ads placed on social media internet sites of GroupMe, LinkedIn, ResearchGate, Lee Stadtlander’s blog, and the large online university’s Participant Pool in addition to four private large online university student groups on social media. In accordance with the IRB, this research used no snowball sampling or any other direct contact methods to recruit participants.

Initial efforts to recruit participants generated 28 participants in the first two and one-half months. Once the petitions to post a recruitment invitation to the additional groups received approval from the IRB and private site administrators, the number of participants increased to 65 at three months and 166 at eight months, and an additional 65 participants were added during the ninth month of recruitment that increased the total number to 231 participants. The G*Power analysis indicated a need for at least 300 participants. After nine months of recruiting, it was determined that further recruitment

would not lead to more participants and the survey was closed. One hundred twenty-three of the 231 participants completed the full survey. A total of 108 participants did not answer all questions that made up the full survey. Participants with incomplete surveys were dropped from analysis. Two additional participants were dropped from the analysis of the main study due to extreme responses in excess of three standard deviations above the mean for BMI and exceeding the critical Mahalanobis distance.

Since this research used a static group comparison quasi-experimental design, no data collection occurred before participant enrollment in the large online University health psychology or other graduate program. In other words, no baseline descriptive or health behavior data was obtained from this sample due to the experimental design that collects data solely after being exposed to the health psychology graduate curriculum. The group of graduate students enrolled in online programs other than health psychology provided comparison data. As noted in Chapter 3, the scale reliability of the test instruments was previously reported but also is tested here and shown in Table 1. Each of the test instruments was analyzed with the Shapiro-Wilk test for small samples and was found to violate the assumption of normality of the distribution of scores (Ghasemi & Zahediasl, 2012). The General Perceived Self-Efficacy Scale exhibited a bimodal distribution of scores.

Results

Measurement Assumptions and Procedures

Statistical tests used to analyze the data (Pearson correlation coefficient, Pearson Chi-square for independence, independent samples *t*-test, binary logistic regression, one-

way analysis of variance and multivariate analysis of variance) had assumptions that included: random sampling, independent observations, normal distribution of data, homogeneity of variance, adequate sample size for the test, and reduce as much as violate the assumption of normality of the distribution of scores . The General Perceived Self-Efficacy Scale exhibited a bimodal distribution of scores (discussed further below).

Table 1

Internal Consistency Measures of Major Study Constructs

	Cronbach's Alpha	Mean	SD
General Perceived Self-Efficacy	0.83	34.91	3.44
Basic Psychological Needs: Total	0.89	118.49	15.12
Scale			
Basic Psychological Needs:	0.73	38.09	5.95
Autonomy			
Basic Psychological Needs:	0.76	35.00	5.75
Competence			
Basic Psychological Needs:	0.81	44.87	7.29
Relatedness			
Social Desirability Scale-17	0.73	22.09	3.13

Note. Data for this table was obtained from 121 online graduate student participants in the present study.

Statistical tests used to analyze the data (Pearson correlation coefficient, Pearson Chi-square for independence, independent samples *t*-test, binary logistic regression, one-

way analysis of variance and multivariate analysis of variance) had assumptions that included (Pallant, 2013): random sampling, independent observations, normal distribution of data, homogeneity of variance, adequate sample size for the test, and reduce as much as possible the likelihood of Type I, Type II errors. Due to the static-group comparison quasi-experimental study research design, the present study's sample was not random. Each group was not studied previously as in a test-retest design. Participants were accepted who lived in the United States and who were enrolled in a large online university's health psychology graduate program or in another graduate program. The participants were not assigned to a particular group since they were enrolled in their graduate program of choice. Each participant could only participate by taking the survey one time. This sample was quite small, the number of participants in each group were not equal, and data was not normally distributed.

Levene's test for equality of variances was conducted with the independent samples t-tests. The results of Levene's test were not significant indicating that the equality of variance assumption was not violated. The interpretation of answers to this survey by participants who were from an unstudied population of online graduate students requires caution due to the quasi-experimental nature of study and multiple limitations such as, non-random assignment to groups, lack of normal distribution of data, small sample, and unequal group sizes. Each of these limitations contributed to a reduction of the power of the statistical analysis of this study and increased the likelihood of making a Type II error and failing to reject a false null hypothesis.

In addition to BMI (maintaining within the normal range of 18.5 to 24.9), the CDC health behaviors variables and their recommended objectives that were examined in this study were: obtaining sufficient sleep (7-8 hours sleep per night on average), tobacco use (not smoking tobacco cigarettes), alcohol use (drinking at most 1-2 alcoholic drinks in a day if drinking at all), and leisure time physical activity (engaging in 150 minutes of light to moderate intensity leisure time physical activity per week, engaging in lifting weights or doing calisthenics two days per week, and engaging in 75 minutes per week of vigorous intensity leisure time physical activity). Apart from the continuous variable (BMI), the health behavior variables were coded as dichotomous so they would relate directly to the CDC recommended objectives. The demographic variables were also coded to be dichotomous except for the continuous variable, age.

Sample Characteristics

Demographic variables of this sample of 121 participants are presented in Table 2 for the whole sample and by graduate student group. All participants were students at a large online university who were enrolled in the health psychology program or some other program. Length of time in the graduate program ranged from under 1 year to 12 years. Age of the participants in this sample ranged from 25 to 73 years ($M = 45.4$ years, $SD = 11.05$). The mean age of the two groups of graduate students were significantly different ($t(119) = 3.695, p < .001$, two-tailed). Health psychology graduate students were significantly older ($M = 51.31$ years, $SD = 11.67$) than graduate students in other programs ($M = 43.57$ years, $SD = 10.24$). Most of the participants ($n = 114/121, 94%$)

had previous experience attending graduate school and obtaining a degree; of these, most (n = 112/114, 98%) reported obtaining a masters degree.

Whether the present sample was representative of the greater population of online health psychology or other program graduate students could not be determined due to the lack of research that relates to the study of health behaviors of online graduate students. No record of the characteristics of this population was available nor was there an estimate of the size of this population. This sample presented basic information for further study. Whether this sample related to or was representative of the broader population of this large online university's graduate students was not available at this time must await further study.

Hypotheses Testing

RQ1: Do demographic variables (gender, race, age, marital status, geographical area, place of residence, and employment) explain differences in maintaining normal BMI or of engagement in health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, light to moderate intensity, and/or muscle strengthening with weights and/or calisthenics)?

H₀1: There are no significant differences in maintaining normal range BMI or engaging in health behaviors by demographic characteristics of the sample.

H_a1: There are significant differences in maintaining normal range BMI or engaging in health behaviors by demographic characteristics of the sample.

Table 2

Demographic Characteristics of Full Sample and By Graduate Student Group

<i>Demographic</i>	Full Sample (<i>N</i> = 121, 100%)		Health Psychology Group (<i>n</i> = 29, 24%)		Other Programs Group (<i>n</i> = 92, 76%)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Male	103	85.1	4	13.8	14	15.1
Female	18	14.9	25	86.2	78	84.9
Race						
Black/African American	43	35.5	9	31.0	34	36.6
White/Caucasian	60	49.6	14	48.3	46	49.5
Other Races	18	14.9	6	20.7	13	13.9
Marital Status						
Married	73	60.3	17	58.6	56	60.9
Not Married	48	39.7	12	41.4	36	39.1
Geographic Area						
Northeast	22	18.2	6	20.7	16	17.4
Midwest	18	14.9	2	6.9	16	17.4
South	60	49.6	14	48.3	46	50.0
West	21	17.4	7	24.1	14	15.2

(table continues)

	Full Sample (N = 121, 100%)		Health Psychology Group (n = 29, 24%)		Other Programs Group (n = 92, 76%)	
<i>Demographic</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Place of Residence						
Large/ Small Urban Area	83	68.6	19	65.5	64	69.6
Small Town or Rural Area	38	31.4	10	34.5	28	30.4
Employment						
Full Time	78	64.5	18	62.1	60	64.5
Part-time or Unemployed	43	35.5	11	37.9	32	35.5

Separate statistical tests were used to analyze the data that were appropriate for the type of variable being tested (continuous or categorical). Each of the demographic variables (gender, race, age, marital status, geographical area, place of residence, and employment) was statistically tested with BMI and each of the health behavior variables (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, light to moderate intensity, and/or muscle strengthening with weights and/or calisthenics). The results of those individual tests follow.

Age and BMI are both continuous variables. Age is a demographic variable and BMI is a health behavior variable. Pearson correlation coefficient was conducted to compare mean age ($M = 45.58$, $SD = 10.94$) to mean BMI ($M = 30.21$, $SD = 6.98$). The result ($r(121) = .028$, $p = .69$) indicated that there was no significant relationship between the two variables and the null hypothesis was not rejected.

Independent sample *t*-tests were conducted with age and health variables (sleep, leisure time physical activity-vigorous, -moderate and -calisthenics or weightlifting, not drinking or drinking responsibly). Results did not indicate a statistically significant relationship between age and these individual health variables and the null hypothesis was not rejected.

BMI was tested with each of the demographic variables (gender, race, marital status, employment, part of United States lived in, whether participant resides in urban or rural environment). One-way ANOVA was conducted comparing BMI and Black/African American group ($M = 32.27$, $SD = 7.11$), White/Caucasian ($M = 28.58$, $SD = 6.50$), and Other Race ($M = 30.64$, $SD = 7.18$). The result ($F(2, 117) = 3.67$, $p = .02$) indicated a statistically significant difference between groups. The effect size was moderate at $\eta^2 = .06$. Post hoc comparison using the Tukey HSD test indicated that Black/African American BMIs were significantly different from White/Caucasian BMIs and the null hypothesis was rejected for Black/African American BMIs and White/Caucasian BMIs. No significant relationship was found between Other Race group and Black/African American group or White/Caucasian group and the null hypothesis was not rejected for Other Race BMI. Mean BMI of Black/African American group was significantly higher than White/Caucasian group, while the Other Race group did not significantly differ from the other groups.

One-way ANOVA was conducted between BMI and Marital Status, Married ($M = 29.12$, $SD = 6.91$) and Not Married ($M = 31.86$, $SD = 6.83$). The result ($F(1, 118) = 4.59$, $p = .03$) was statistically significant. The effect size was small at $\eta^2 = .03$ and the

null hypothesis was rejected. Participants who were married had lower mean BMI than did the participants who were unmarried.

One-way ANOVA was conducted between BMI and Geographic Area where the participant lived. No significant association was found with the Geographic Areas of Northeast, Midwest, or South and the null hypotheses with relation to those comparisons were not rejected. There was a significant association between BMI and Geographic Area – West ($F(1, 118) = 4.43, p = .04$). The effect size was small at $\eta^2 = .03$. Participants who lived in the Geographic Area West had a lower mean BMI ($M = 27.34, SD = 6.99$) than participants in other parts of the United States ($M = 30.82, SD = 6.86$) and the null hypothesis was rejected.

Chi-square for independence was conducted and indicated a statistically significant association between racial group and obtaining an average of seven to eight hours of sleep in a 24-hour period. A higher percentage of Caucasian/White (60%) than African American/Black (24.3%) or Other Races (15.7%) ($\chi^2(1, n = 121) 9.67, p = .008, phi = .28$) obtained the recommended CDC objective for sufficient sleep (an average of seven to eight hours of sleep in a 24-hour period).

Chi-square for independence was conducted and indicated a statistically significant association between gender and leisure time physical activity – vigorous. A higher percentage of males (61.1%) than females (32%) ($\chi^2(1, n = 121) 4.41, p = .03, phi = .21$) engaged in vigorous leisure time physical activity to the level of CDC recommended objective.

Individual Chi square for independence tested each of the following pairs of variables: BMI and gender, BMI and employment, BMI and whether the participant resided in a large or small urban or rural-small town environment. Results indicated no statistically significant relationship and the analysis failed to reject the null hypotheses.

Individual Chi-square for independence were conducted with each of the demographic variables (gender, race, marital status, employment, part of United States lived in, whether participant resides in large or small urban or small town/rural area) and health behavior variables (sleep, leisure time physical activity – vigorous, -moderate, -calisthenics/weight lifting, alcohol use, tobacco cigarette use). No statistically significant relationship was found, and the analysis failed to reject the null hypotheses for Chi-square tests of gender and sleep, gender and physical activity moderate, gender and physical activity calisthenics/weightlifting, gender and alcohol use, gender and tobacco cigarette use.

Individual Chi-square for independence were conducted with race and leisure time physical activity – vigorous, race and leisure time physical activity – moderate, race and leisure time physical activity – calisthenics/weightlifting, race and alcohol use, race and tobacco cigarette use. No statistically significant relationship was found. The analysis failed to reject the null hypotheses.

Individual Chi-square for independence were conducted with marital status and sleep, marital status and leisure time physical activity – vigorous, race and leisure time physical activity – moderate, race and leisure time physical activity –

calisthenics/weightlifting, race and alcohol use, race and tobacco cigarette use. No significant relationship was found. The analysis failed to reject the null hypotheses.

Individual Chi-square for independence tests were conducted with employment and sleep, employment and leisure time physical activity – vigorous, employment and leisure time physical activity – moderate, employment and leisure time physical activity – calisthenics/weightlifting, employment and alcohol use, employment and tobacco cigarette use. No statistically significant relationship was found. The analysis failed to reject the null hypotheses.

Individual Chi-square for independence tests were conducted with each geographic area of United States where participants lived (West, Northeast, Midwest, and South) and each of the health variables of sleep, leisure time physical activity – vigorous, -moderate, and –calisthenics/weight lifting, employment, alcohol use, and tobacco cigarette use. No statistically significant relationship was found. The analysis failed to reject the null hypotheses.

Individual Chi-square for independence tests were conducted with each area where participants lived (large or small urban area or small town/rural area) and each of the health variables of sleep, leisure time physical activity – vigorous, -moderate, and –calisthenics/weight lifting, employment, alcohol use, and tobacco cigarette use. No statistically significant relationship was found. The analysis failed to reject the null hypotheses.

RQ2: Is there a difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI

and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening with weights and/or calisthenics) as categorized according to CDC recommended guidelines?

H₀2: There is no significant difference between online health psychology graduate students and online graduate students from other programs in terms of reaching CDC objectives for BMI and health behaviors as categorized according to CDC recommended guidelines.

H_a2: There is a significant difference between online health psychology graduate students and online graduate students from other programs in reaching CDC objectives for BMI and health behaviors as categorized according to CDC recommended guidelines.

To test this hypothesis, Chi-square tests were conducted to determine if there was an association between online health psychology graduate students and online graduate students from other programs related to reaching CDC recommended levels of BMI and individual health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening with weights and/or calisthenics). No statistically significant association between online health psychology graduate students and online graduate students from other programs was found for BMI or any of the health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening with weights and/or calisthenics) ($p > .05$) and failed to reject the null hypotheses.

The BMI of the two groups of graduate student participants was tested with independent samples *t*-tests. No statistically significant difference in mean BMI was found when comparing health psychology graduate students ($M = 28.87$, $SD = 6.67$) and graduate students from other programs ($M = 30.81$, $SD = 7.16$). The null hypothesis was not rejected

The mean BMIs of both groups of graduate students exceeded the recommended CDC objective of a BMI in the range from 18.5 to 24.9. To examine this result more closely, a one-sample *t* test was conducted to compare the entire sample to CDC recommendations for BMI. The mean BMI for the entire sample ($M = 30.33$, $SD = 7.07$; $t(120) = 13.43$, $p < .01$) was significantly higher than the average BMI of 21.7. The average BMI was calculated by adding the lower and upper figures for normal range and dividing that sum by two. The effect size *d* of 1.22 indicates a large effect. Taken alone, the health psychology graduate students' mean BMI ($M = 28.61$, $SD = 6.44$) was significantly higher than the CDC recommended BMI ($t(28) = 5.77$, $p < .01$).

RQ3: Do mean scores from tests of theory concepts of general perceived self-efficacy, autonomy, competence, or relatedness differ between online health psychology graduate students and online graduate students from other programs?

H₀₃: There are no significant differences between mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness between online health psychology graduate students and online graduate students from other programs.

H_{a3} : There are significant differences between mean scores from tests of general perceived self-efficacy, autonomy, relatedness, and competence between online health psychology graduate students and online graduate students from other programs.

A one-way between groups MANOVA was conducted to compare differences in test scores for general perceived self-efficacy, autonomy, competency and relatedness obtained by health psychology and online graduate students in other programs. Preliminary assumption testing was conducted to check variance-covariance matrices, and multicollinearity, with no serious violations noted with the exception of self-efficacy score which was bimodal instead of linear. When this test was included with the rest of the test score means, it violated the assumption of equality of variances suggesting a need for a more conservative alpha level to be used. This one-way multivariate analysis of variance was run twice, once to include and once to exclude general perceived self-efficacy as one of the dependent variables. Means for each group of graduate students and the whole sample differed slightly more than one point. No statistically significant difference was found between health psychology graduate students and graduate students from other programs on the combined dependent variables in either statistical procedure. The results were not statistically significant and failed to reject the null hypothesis.

RQ4a: Is there a correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness?

H_{04a} : There is no significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

Ha4a: There is a significant correlation between BMI and mean scores from tests of general perceived self-efficacy, autonomy, competence, and relatedness.

BMI and the concept test scores (general perceived self-efficacy, autonomy, competence, and relatedness) were continuous variables, so Pearson product-moment correlation coefficient was used to investigate any relationship between them. One statistically significant correlation was found between BMI and autonomy ($r = -.205$, $n = 121$, $p < .05$); higher scores on BMI were associated with lower scores on autonomy. The null hypothesis was rejected.

RQ4b: How well do the set of predictor variables (mean scores on self-efficacy, autonomy, competence, and relatedness) predict or explain engagement in health behaviors according to CDC recommended guidelines?

H₀4b: Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do not predict or explain engagement in health behaviors according to CDC recommended guidelines.

H_a4b: Predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) do predict or explain engagement in health behaviors according to CDC recommended guidelines.

Binary logistic regression was used to analyze the relationship between the categorical health behavior variables (sleep, tobacco cigarette use, alcohol use, engaging in vigorous or moderate leisure time physical activity, muscle strengthening with calisthenics or weight lifting), and the continuous scores on general perceived self-efficacy, autonomy, relatedness, and competence for the entire sample of online graduate

students. Results of the binary logistic regression showed that the model containing independent variables of mean test scores on general perceived self-efficacy, autonomy, competence, relatedness did not predict participants reaching CDC recommended objective guidelines for health behaviors (sleep, tobacco cigarette use, alcohol use, engaging in vigorous or moderate leisure time physical activity, muscle strengthening with calisthenics or weight lifting). The dependent variables tested separately were sufficient sleep ($\chi^2 (4, n = 121) = 5.74, p = .22$), not smoking ($\chi^2 (4, n = 121) = 1.89, p = .76$), alcohol use ($\chi^2 (4, n = 121) = 3.53, p = .47$), light to moderate intensity physical activity ($\chi^2 = 4.87 (4, n = 121), p = .30$), vigorous intensity physical activity ($\chi^2 (4, n = 121) = 2.23, p = .69$), and muscle strengthening with lifting weights and/or performing calisthenics ($\chi^2 (4, n = 121) = 3.64, p = .46$).

The data failed to reject the null hypothesis that predictor variables (mean test scores on general perceived self-efficacy, autonomy, competence, and relatedness) do not predict or explain reaching CDC objectives for health behaviors (sleep, tobacco cigarette use, alcohol use, engaging in vigorous or moderate leisure time physical activity, muscle strengthening with calisthenics or weight lifting) as categorized according to CDC recommended guidelines. In the current study predictor variables (mean scores on general perceived self-efficacy, autonomy, competence, and relatedness) were not able to predict or explain the engagement in health behaviors.

RQ5: Are there differences between mean scores for desirability bias between students in online health psychology graduate programs and students enrolled in other graduate programs?

H₀5: There is no significant difference between mean scores for bias among online health psychology graduate students and students in other graduate programs.

H_a5: There is a significant difference between mean scores for bias among online health psychology graduate students and students in other graduate programs.

The Social Desirability Scale-17 (Stöber, 2001) was used to obtain mean scores from students in online health psychology graduate students or students enrolled in other graduate programs. One-way ANOVA was used to compare the mean bias test scores of online health psychology graduate students and online graduate students in other programs all of whom attended a large online University. No statistically significant difference was found between means of the groups of participants. Since there were only two groups no post-hoc tests were conducted. The data failed to reject the null hypothesis.

Summary

The resulting answers to the first research question are mixed. RQ1 question asked whether the demographic variables (gender, race, age, marital status, geographical area, place of residence, and employment) explained differences in engagement in maintaining a healthy range BMI and health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, light to moderate intensity, and/or muscle strengthening with weights and/or calisthenics). In the present sample of graduate students, few of the demographic variables were significantly related to engagement in health behaviors. The demographic characteristics of the whole sample and each graduate student group were presented in Table 2. The null hypothesis that

there were no significant differences in health behaviors by demographic characteristics of the sample was rejected for vigorous intensity leisure time physical activity and gender with males engaged more than females. There was a significant difference noted for sleep and race where White/Caucasian participants slept 7-8 hours per 24 hours more frequently than Black/African American participants. The null hypothesis was also rejected for BMI and marital status where BMI was lower for married than for not married participants, and BMI and geographic area where participants in the West had lower BMI than participants in the Northeast, Midwest, or South of the United States. There was a significant difference in BMI by racial group where Black/African American participant BMI was higher than the BMI of White/Caucasian participants.

RQ2 examined whether the graduate student groups differed in performance of health behaviors to the level of CDC objectives. Results showed no significant difference between the health psychology graduate students and the graduate students from other programs engaging in health behaviors to the extent that met or exceeded CDC objectives with one exception. BMI was outside the normal range for both groups. The data did not reject the null hypothesis that BMI there was no significant difference between online health psychology graduate students and graduate students from other programs.

RQ3 examined the mean theoretical concept test scores for general perceived self-efficacy, autonomy, relatedness, and competence to see if there was a difference between health psychology graduate students and online graduate students from other programs. Analysis failed to reject the null hypothesis that there was no difference between mean scores on general perceived self-efficacy, autonomy, relatedness, or competence for

online health psychology graduate students and online graduate students from other programs.

The fourth research question had two parts. One part of RQ4a examined the relationship of BMI and the mean test scores of general perceived self-efficacy, autonomy, competence, and relatedness). RQ4b examined the health behaviors (sleep, alcohol use, tobacco use, and leisure time physical activity) and the mean test scores of general perceived self-efficacy, autonomy, competence, and relatedness to see if one or more test was/were predictive of or explain engagement in health behavior to a level categorized according to CDC recommendations. The RQ4a null hypothesis was rejected due to a statistically significant correlation between autonomy and BMI. This correlation indicated that higher scores on BMI were associated with lower, autonomy scores. The analysis related to RQ4b failed to reject the null hypothesis that predictor variables (mean test scores on general perceived self-efficacy, autonomy, competence, and relatedness) do not predict or explain the engagement in health behaviors to the level categorized according to CDC recommendations.

RQ5 examined social desirability bias in both graduate student groups. No statistically significant difference between the mean score on the test for social desirability bias was found. The analysis failed to reject the null hypothesis.

Chapter 5 will provide a discussion of the strengths and limitations of this study. Results and findings will be described with reference to the theoretical frameworks of Bandura (1977) and Deci and Ryan (1985). The recommendations for further study and the implications for social change will also be discussed.

Chapter 5: Discussion, Recommendations and Conclusions

Introduction

The purpose of this static comparison quasi-experimental design study was to examine health behaviors and identify potential predictors of engaging in health behaviors among online health psychology graduate students. BMI and the specific health behaviors studied included sufficient sleep, alcohol use, tobacco cigarette use, and engaging in leisure time physical activity of vigorous to light to moderate intensity, and muscle strengthening with weights and/or calisthenics. The reason to conduct this study was to fill a gap in the knowledge base regarding the health behaviors that graduate students in the health psychology graduate program at an online University include in their lives. In addition, the intent of the present research was to determine if theoretical concepts of general perceived self-efficacy, autonomy, relatedness, or competency had a relationship or were predictive of online health psychology graduate students engaging in healthy behaviors.

Of the five research questions addressed, RQ1 examined whether there was a difference in health behaviors that occurred in differing demographics. In this sample of online graduate students, very few of the demographic variables were significantly related to the health behaviors studied. In the present study, the demographic relationships with health behavior variables that were statistically significant included leisure time physical activity with 61.1% of males while 32% of females engaged in vigorous intensity leisure time physical activity. There was significant difference for race

in obtaining the recommended CDC objective for sufficient sleep which was obtaining an average of 7-8 hours of sleep in a 24-hour period.

Sixty percent of Caucasian/White, 24.3% of African American/Black, and 15.7% of other races reached the objective for enough sleep. Both African American/Black and Caucasian/White mean BMIs were outside of the normal range either in the overweight or obese range. African American/Black participants had a mean BMI of 32.27, that reached statistical significance and was higher than mean BMI of Caucasian/White participants (28.58). BMI exhibited a statistically significant difference depending on marital status. Participants who were unmarried had a mean BMI of 31.86 while the mean BMI for married participants was 29.12. BMI also differed with geographic area where the participant lived. The mean BMI for participants in the West was 27.34, while participants in other parts of the United States (the Northeast, Midwest, and South) had a mean BMI of 30.82. Participants who lived in the Geographic Area-West had a mean BMI that exhibited a statistically significant difference when compared to participants who lived in other areas of the United States.

Low numbers of participants engaged in leisure time physical activity in the present study. Of the 121 participants of this study, 24.8% met objectives for light to moderate physical activity, 24% met objectives for muscle strengthening physical activity, and 36.4% met objectives for vigorous physical activity. In comparison, Schoenborn et al. (2013) reported that 46.1% of adults interviewed met the 2008 federal objectives for aerobic (light to moderate or vigorous) leisure time physical activity with approximately 33.9% of adults not engaging in such activity. Seventy-three percent of

adults were never engaged in muscle strengthening exercise while only 23.0% met the objective for this type of exercise in Schoenborn et al.'s research. In the current sample of graduate students, 75.2% ($n = 92$) did not engage, while 24.8% ($n = 30$) met the objective. Seventy-six percent of graduate students in the present sample indicated that they did not engage in muscle strengthening physical activity ($n = 92$); however, 24% ($n = 29$) met the CDC recommended objective for muscle strengthening or calisthenics physical activity. Vigorous physical activity was not engaged in by 63.6% ($n = 77$) of the graduate students in the present study while 36.4% ($n = 44$) met CDC-recommended objective behaviors. Why the graduate students are lower for meeting the objectives may be due to time constraints that prohibited taking time away from school, work, family considerations, or other activities to engage in leisure time physical activity according to weekly CDC-recommended objectives.

The annual update of the Office of Disease Prevention and Health Promotion (2016) noted that the numbers of adults not engaging in any leisure time physical activity is decreasing slowly. The baseline for engaging in any leisure time physical activity is 43.5% of adults to so engage. For adults the baseline for to engaging in any aerobic physical activity has an objective of 47.9%. Engaging in exercise occurs more often among Caucasian/White individuals or Other Races whether engaging in light to moderate exercise for 150 minutes per week, or vigorous for 75 minutes per week, or a combination of the two types of exercise. Schoenborn et al. (2013) reported that adults in the West were most likely to meet the objectives for aerobic exercise (light to moderate intensity or vigorous intensity) through leisure time physical activity and adults living in

the South were less likely than other areas to have met the 2008 objectives. When comparing the likelihood of who would be meeting the 2008 CDC recommended objectives for health behaviors, Schoenborn et al. (2013) noted that as the education of adults in his study increased, the likelihood of meeting the CDC recommended objectives for health behaviors also increased. Schoenborn et al. (2013) also reported that of the adults with a graduate degree, 63.6% met aerobic objective and 35.1% met the muscle strengthening objective. This differed from the present group of graduate students and may be due to time constraints caused by work, school, family, and other demands.

RQ2 compared health psychology graduate students with the graduate students from other programs, specifically examining the performance of health behaviors to the level of CDC recommended objectives. Results showed no statistically significant difference between health psychology graduate students and graduate students from other programs. The performance of health behaviors to the level of CDC recommended objectives did not differ between the graduate student groups.

RQ3 examined mean theoretical concept scores from tests of general perceived self-efficacy, autonomy, relatedness, and competence to see if there was a difference between health psychology graduate students and online graduate students from other programs. There were no statistically significant differences between mean scores on tests of general perceived self-efficacy, autonomy, competence, or relatedness. The two graduate student groups did not differ in mean theoretical concept test scores.

RQ4a examined the relationship between BMI and health behaviors (sleep, alcohol use, tobacco use, leisure time physical activity) and the mean scores of the

theoretical concept test scores (predictor variables). The purpose of this research question was to examine the theoretical concept test mean scores as a predictor of engaging in health behaviors. There was a statistically significant negative correlation between mean BMI scores and the mean score on the autonomy subscale. Higher mean BMI scores were associated with a lower mean autonomy test score. RQ4b conducted binary logistic regression to create a model of the concept test scores. This model was not statistically significant in predicting or explaining engagement in health behaviors according to the CDC and the null hypothesis was not rejected.

RQ5 examined social desirability bias. No statistically significant difference was found between the mean score obtained by health psychology graduate students and online graduate students from other programs. The null hypothesis was not rejected.

Interpretation of Findings

The findings of this study expand the knowledge base relating to health behaviors for online health psychology and graduate students enrolled in other programs. Research rarely has focused on or reported any information related to the health behaviors of this population. The results from this study must await confirmation from further study.

Demographic characteristics related to the health behaviors examined in the first research question varied broadly from results of Schoenborn et al.'s 2013 study. The current study found that if drinking at all, participants limited drinking to light to moderate alcohol use or one to two drinks on occasions when drinking. Schoenborn et al. (2013) indicated said that the level of current drinking tended to increase with level of education. Schoenborn et al. (2013) did not relate their percentages to any number of

individuals. They did report that 77.3% of individuals with a graduate degree were likely to be current drinkers, with most of them being light (39.9%) to moderate (29.1%) drinkers. Survey questions related to alcohol and other drug use (tobacco and other) were revised in 2015 by Center for Behavioral Health Statistics and Quality (2015). These revisions were significant enough to preclude comparison of Schoenborn et al.'s (2013) data and the present study's data with which utilized the survey produced by the Center for Behavioral Health Statistics and Quality.

Health psychology graduate students and graduate students from other programs did not differ in terms of obtaining sufficient sleep. Race was negatively correlated with sleep. Upon closer examination 70% of the 60 White/Caucasian and 39.5% of the 43 African Black/American graduate student participants in the present study met the objective for sufficient sleep showing that Black/African American participants were less likely to meet the objective for sufficient sleep than other ethnicities in this sample. Schoenborn et al. (2013) noted that 69.7% all adults questioned from age 18 to over 75 indicated meeting the sufficient sleep objective. The results of the present study differed from results of Schoenborn et al. (2013) on the variables of race and obtaining sufficient sleep. In the present study, the 71% of White/Caucasian graduate student participants and 62.5% of Black/African American participants met the CDC recommended objective for sufficient sleep. In 2008, the baseline year for Healthy People 2020 annual data collection, the observed percentage of adult individuals who met the objective for sufficient sleep was 69.6%. The target percentage of individuals to obtain sufficient sleep was set at 70.8% (Office of Disease Prevention and Health Promotion, 2016). No

data was presented in the 2016 annual update that related to ethnic adult sleep. The present graduate student data is not directly comparable to the general population presented due to the lack of categories relating solely to adult graduate students in the government studies (Office of Disease Prevention and Health Promotion, 2016; Schoenborn et al., 2013).

Of the current tobacco cigarette smokers who had acquired a bachelor's or higher graduate degree only 6.1% were current smokers (Schoenborn et al., 2013). All of the graduate student participants in the present study had obtained a bachelor's or higher graduate degree, and while 54 participants (44.6%) either were current smokers or chose not to respond, another 67 (55.4%) were not current smokers or had quit smoking. The present data do not directly relate to the CDC study, but show a similar trend toward non-smoking. In 2008, the baseline year for Healthy People 2020 annual data collection, the observed percentage of individuals who had quit smoking was 50.2%. This information indicated a trend toward more individuals being successful in cessation attempts, although the percentage was 55.0% in 2016 with an CDC recommended objective is 80% of smokers quitting the habit by 2020 and reaching a target of 12% or fewer current smokers (Office of Disease Prevention and Health Promotion, 2016). Schoenborn et al. (2013) reported that the cessation of smoking varied with the geographic area where the participant lived. The graduate students in the current study did not show a preference to quit smoking in a specific geographic area.

RQ2 posed the question of whether the two groups of graduate students differed in health behavior engagement. There was no significant difference between the two

online graduate student groups in health behaviors categorized as CDC objectives. Conclusions based on a static group comparison quasi-experimental design, the small sample, unequal groups and the lack of previous data relating to this population of online health psychology graduate students would be misleading and must await further research.

The theoretical concepts used in this study as predictors of health behaviors were general perceived self-efficacy, autonomy, relatedness, and competence. The concept scores were obtained from the General Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) and the Basic Need Satisfaction in General Scale (Deci & Ryan, 2015). RQ3 was designed to question whether mean concept scores differed between online health psychology graduate students and online graduate students from other programs. No statistically significant difference was found between the two online graduate student groups and mean concept test scores (general perceived self-efficacy, autonomy, competence, and relatedness).

RQ4a examined the relationship of engaging in maintaining normal BMI and engaging in health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening and/or calisthenics) and the mean scores of the theoretical concept test scores (general perceived self-efficacy, autonomy, competence, and relatedness). There was one statistically significant negative correlation between the mean BMI scores and the mean score on the autonomy subscale. This finding indicated that higher mean scores on BMI were associated with lower mean scores on autonomy. Ng et al. (2012)

described autonomy as used by self-determinism theory to be a result of “internalization of behavioral regulations and values...” (p. 336). The relationship between autonomy and BMI according to the self-determinism theory indicates how autonomy relates to values that the individual has internalized.

RQ4b examined the theoretical concept scores as potential predictors of engaging in health behaviors. Binary logistic regression was conducted to create the model of the theoretical concept scores (general perceived self-efficacy, autonomy, competence, and relatedness). This model was not statistically significant in predicting the engagement in health behaviors (sleep, tobacco cigarette use, alcohol use, and leisure time physical activity of vigorous intensity, of light to moderate intensity, and of muscle strengthening and/or calisthenics).

RQ5 related to the question of whether one graduate student group was more likely to engage in social desirability bias. The mean test scores of the graduate student groups for social desirability bias were not significantly different. The null hypothesis was not rejected.

Limitations of the Study

The selection of the research design for this study, the static group comparison quasi-experimental design, was chosen to compare two participant groups who were differentiated by their course of graduate study. Campbell and Stanley (1963) described this design as one in which a treatment effect may be examined when a group that experienced the treatment is compared with a group which has not. Frequently used in educational settings to test teaching method effectiveness, this design is known to have

benefits as well as limitations. The benefits of use of quasi-experimental research design include the low cost and the ease of conducting such a study. However, the limitations may influence internal validity, for example the lack of random assignment to the groups, the lack of control over who completes the survey, unequal group sizes and the lack of assessment of participants prior to one group receiving the treatment or making choice of online doctoral program. External validity may also be influenced through selection and treatment. These limitations taken together contribute to the reason why Campbell and Stanley described the static group comparison quasi-experimental design as perhaps the weakest quasi-experimental design.

The limitations of this study must be kept in mind when examining the results because this quasi-experimental study can only provide an indication of association, not causality and restricts type of statistical analysis (Campbell & Stanley, 1963). The type of study, being a survey, limits the range of answers to only the answers listed. The questions that could have used an answer of “do not want to answer” or “do not do what is being asked” were not consistently placed in each health behavior question.

Self-reported answers were discussed extensively in the literature with the likelihood that self-reported answers were not completely accurate and may be due to recall bias (Girschik et al., 2012; Lauderdale et al., 2008; Prince et al., 2008; Racette et al., 2014; Short et al., 2012; Stommel & Schoenborn, 2009). The number of online graduate students in health psychology programs was not known, nor were the number of online graduate students known for the online University. An equal number of participants were not obtained for each group of graduate students. Obtaining a sample

of the size originally recommended proved difficult so after 9 months the recruitment was stopped. After cleaning the sample of participants who did not complete the survey or exhibited extreme scores, the sample was much smaller than intended. Due to the small sample of participants, the design limitations which include the lack of random assignment to groups, use of a non-equivalent control or comparison group, reduced internal validity, and the results do not support conclusions related to causality and must be interpreted carefully. In addition to the small sample size, the results must be tentative due to the lack of information regarding the graduate student groups background, and the likelihood the groups differ or are similar with one another in areas other than related to the study of health psychology.

Many of the limitations found with this study were unavoidable with this design. The power of this study was reduced from the original design, in part due to the small sample size, as well as the unequal size graduate student groups and non-equivalent graduate student groups. Additionally, the lowered power due to the non-random assignment of participants to groups and the non-equivalent test groups further limits the generalizability of results. The generalizability of the results of this static group comparison quasi-experimental design survey study must be viewed with caution and await further research to replicate or dispute the current findings that have provided new information and indication of the direction and potential importance of the findings. Future studies of this population are encouraged to increase the sample size, examine health behaviors through a test-retest or longevity type study in order to avoid some of the threats relating to lack of power and Type I or Type II errors.

The general perceived self-efficacy test results were bi-modal which may have contributed to not meeting the statistical assumption for linearity and leading to results that did not approach statistical significance. Bimodality indicated that scores were not linear but rather had two modes or clusters of scores. The statistical analysis in research question 4 did not reveal any statistically significant difference for the general perceived self-efficacy test result whether the scores were included in the analysis along with the other three test scores (autonomy, competency, and relatedness) or they were removed from the analysis.

The participants who posed a threat to the internal validity of this study by having extreme scores or by having incomplete survey answers were excluded from the analysis. Being a static comparison quasi-experimental design study, threats to this study did not occur from time-related issues such as maturation, mortality, pre-or post-experimental experiences that differed for the participants. Compensatory rivalry was not an issue since no compensation was provided.

External validity threats are derived from the groups who took part in this study and are the only ones to whom the results may be generalized. No other potential threats to external validity were noted such as need of different setting for test taking or somehow arranging a test-retest alteration to the study design. With both designs, the requirement of multiple settings for test taking or the creation of a test-retest alternative to avoid problems of the present design, would create a differently designed study and would not conveniently be available for maintaining the anonymity of online graduate students. The potential of a research design requiring in-person delivery of surveys

would have also been prohibitive in cost and time for testing online students who live throughout the United States.

Implications and Recommendations

Positive social change from the individual to a policy level needs to permeate our society regarding the engagement in health behaviors. The importance of maintaining and conveying the results in good health cannot be overstated. The meaning of good health includes obtaining sufficient sleep, maintaining a normal BMI, not smoking tobacco cigarettes, drinking responsibly if at all, and engaging in recommended leisure time physical activities that are both aerobic and muscle strengthening. It is commonly known that not engaging in these health behaviors frequently leads to the development of chronic, preventable diseases that absorb large sums of money for treatment, much time and resources, as well as robbing the individual of quality of life and productivity. Governmental agencies, educational facilities, hospitals, and physicians have been working to provide health education to the public for the purpose of engaging individuals in taking care of themselves. Sedentary lifestyles are very damaging to the individual and ultimately society. Why individuals do not all live healthy lifestyles and how the health community and others are able to encourage people to internalize health principles are questions that need to be answered to create positive social change in the reduction and prevention of chronic diseases associated with aging.

Future studies of health psychology graduate students should consider a longitudinal study of a large sample of participants from online graduate schools to more fully understand the impact of health psychology principles on behavior over time. In

addition, a mixed method design would allow for a closer examination of the participants to obtain their comments relating the health behaviors engaged in and potential time restraints. Research to explore the relationship between incorporating health behaviors in everyday life and the study of the benefits of those health behaviors is highly recommended and has not been performed within the population of online-health psychology graduate students.

Although the sample was small the findings of this study provide new information that approximately one-third of the online graduate students were engaged in certain health behaviors to the level of the recommended CDC objectives, while about the same percentage of participants were not meeting those objectives or were not engaging in any health behaviors. Providing encouragement within the health psychology curriculum that is supportive of engaging in health behaviors to the level suggested by CDC could be presented as a section in introductory or other required courses to focus on benefits to the student and later as a professional. The presentation of leisure time physical activities could emphasize the benefits to the student. Although the activities would take time away from studies or work the activities would potentially provide benefits to the student with increased energy and better mood control.

The importance of presenting a healthy appearance to lend credibility to the health psychologist's message was discussed in the literature with relationship to health professionals other than health psychologists. Previous research (Black et al., 2012; Bleich et al., 2013; Frank et al., 2000; Helfand & Mukamal, 2013; Lobelo et al., 2009; Oberg & Frank, 2009; Puhl et al., 2013) in this area was related to the practice or

counseling provided by medical doctors, physical therapists, and other health professionals. The current data from the sample of online graduate students indicated that only a small portion of participants in this study were close to reaching the health behavior objectives recommended by CDC. This suggests that online health psychology students may benefit from examining and considering modifications their own health behaviors during their program.

Future research should define the health behavior definitions more clearly. For example, the leisure time physical activity needs to include activities such as maintaining a home, cleaning, painting, gardening, and activities that are usually called “work” but may well occur during leisure time or be related to hobbies. This definition would expand on the CDC Healthy People 2020 definitions. In addition, supportive discussions in health psychology courses to engage in health behaviors that offset feelings of being tired. Emphasizing the positive results of engaging in healthy behaviors that fine-tune the body with greater energy.

Conclusions

Yet to be discovered are methods to encourage and support engaging in health behaviors so that they become commonly practiced and supported. The options to comply with the lifestyle of health may involve intervals of exercise or learning how to maintain a healthy diet so one’s weight does not get out of control. Education of the public is necessary to provide all the alternative methods to use to maintain their health. The purpose of this education is to increase the individual’s awareness of their responsibility for maintaining their own health and seeking professional help if or when it

may become needed. Exercise, maintaining a normal range BMI, not smoking or quit smoking tobacco cigarettes, drink responsibly or not at all, and regularly obtaining sufficient sleep describe behaviors that are required to maintain physical health. In essence, the importance of taking charge of health is to increase longevity and the quality of life both of which depend on maintaining good health.

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Appendix A: Demographic Questions

The following questions were asked to obtain demographic information:

Gender

Male

Female

Age today is _____

Race

White

Black or African American

Hispanic or Latino

American Indian or Alaskan Native

Native Hawaiian or other Pacific Islander

Asian

Choose not to respond

Education

Enrolled at a large online University's Health Psychology Master's Program?

Yes No

Enrolled at a large online University's Health Psychology Doctoral Program?

Yes No

Number of years in program: _____

Have you taken Stress and Coping? Yes No

Have you obtained another graduate degree? Yes No

If so, what was that degree? MA Ph.D. MD Or _____

If so, in what area did you obtain another degree? _____

Enrolled in Some Other Master's Program at large online university?

Yes No

Enrolled in Some Other Doctoral Program at a large online University?

Yes No

If you are not enrolled in this large online university Master's or Doctoral Program

you do not qualify for participation in this study and will now exit. Thank you for your interest.

Marital Status

Never married

Married

Cohabiting (not married)

Divorced or Separated

Widowed

Geographic region of the United States where you live

Northeast [Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New York, New Jersey, Pennsylvania]

Midwest [Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, Nebraska]

South [Delaware, Maryland, District of Columbia, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Arkansas, Texas]

West [Washington, Oregon, California, Nevada, New Mexico, Arizona, Idaho, Utah, Colorado, Montana, Wyoming, Alaska, Hawaii]

Place of residence

- Large urban area (over 1,000,000 population)
- Small urban area (less than 1,000,000 population)
- Small town or rural area (less than 50,000 population)

Employment

- Full Time
- Part Time Number of hours worked per week: _____
- Unemployed

Have you ever held a position in a healthcare related field?

- Yes No

Do you, personally, qualify for a disability parking placard?

Yes No I do not drive

Do you use Financial Aid to attend school?

Yes

No

Appendix B: Health Behavior Objectives

The following objectives or target behaviors are derived from Healthy People 2020 website:

Sleep: Average of 7-8 hours per 24 hours

BMI: Reduce proportion of adults who are obese (BMI over 30)

Healthy weight range of 18.5 to 24.9, $\frac{\text{Mass (kg)}}{(\text{height (m)})^2}$ or $\frac{\text{Mass (lb)}}{(\text{height (in)})^2}$

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Leisure Time Physical Activity

150 minutes per week of moderate intensity aerobic exercise

And Twice per week engage all muscle groups in muscle strengthening exercise

OR

75 minutes per week of vigorous intensity aerobic exercise

And Twice per week engage in muscle strengthening of all muscle groups

Alcohol Use

Moderate alcohol consumption of one drink per day for females, up to two drinks per day for males

Avoid heavy drinking (for men this would be consuming 15 or more drinks per week, and for women would be consuming 8 or more drinks per week)

Avoid binge drinking (for men this is 5 or more drinks on a single occasion or for women would be 4 or more drinks on a single occasion usually within 2 hour period)

Tobacco Use objectives of Healthy People 2020 involve the following:

Reduce tobacco use and initiation

Adopt policies and strategies to increase access, affordability, and use of smoking cessation services and treatments.

Establishing policies to reduce exposure to secondhand smoke, increase the cost of tobacco, restrict tobacco advertising, and reduce illegal sales to minors. Each objective includes a nationally representative and reliable data source, baseline estimate, and target for specific improvements to be achieved by the year 2020.