Winter 2010

College Student Adjustment and Health Behaviors

Lisa Anne Hall
Old Dominion University

COLLEGE STUDENT ADJUSTMENT AND HEALTH BEHAVIORS

by

Lisa Anne Hall
B.S. May 2000, Old Dominion University
M.S. May 2005, Old Dominion University

A Dissertation Proposal Submitted to the Faculty of Old Dominion University in Partial Fulfillment of the Requirement for the Degree of

DOCTOR OF PHILOSOPHY

HIGHER EDUCATION

OLD DOMINION UNIVERSITY
December 2010

Approved by:

_____
Alan Schwitzer (Chair)

_____
Dana Burnett (Member)

_____
Jennifer Green (Member)

ABSTRACT

COLLEGE STUDENT ADJUSTMENT AND HEALTH BEHAVIORS

Lisa Anne Hall
Old Dominion University, 2010
Chair: Dr. Alan Schwitzer

This study explored the relationship between student adjustment theory and college student health behaviors. Specifically, this research examined first-year freshmen college student physical activity and nutrition behaviors and impact on adjustment to college (N = 37,564). The design for this study was a non-experimental *ex post-facto* examination of archival data provided by the American College Health Association's National College Health Assessment II survey, spanning academic years 2008 through 2009. The main variables in this study included student physical activity and nutrition behaviors. Baker and Siryk's student adjustment theory was used as a theoretical framework to identify survey questions related to academic, personal-emotional, and social adjustment. A significant, positive correlation was found between students who engage in physical activity and healthy eating behaviors and level of student adjustment. In addition, students who reported meeting national recommendations for physical activity and fruit and vegetable consumption exhibited significantly greater academic, personal-emotional, and social adjustment. The results of this study indicate a need for further research on the effects of physical activity and nutrition on college student adjustment. Furthermore, the results can be used as a foundation for educational programming for higher education professionals.

Members of Committee: Dr. Dana Burnett

Dr. Jennifer Green

ACKNOWLEDGEMENTS

Though the following dissertation is an individual work, I could never have finished it without the help, support, guidance, and efforts of faculty, colleagues, friends, and family members. I would like to express my gratitude to these individuals for their support and assistance.

First and foremost, I'd like to thank my committee chair, Dr. Woody Schwitzer. I came to you with an idea for this project, knowing it was a little "out of the box", and you were just as excited about the possibilities. Your support in this process has been invaluable, along with the challenges you presented, which helped me to improve as a scholar. The other members of my committee deserve the same gratitude. Dr. Dana Burnett, thank you for your enthusiasm and motivation. Dr. Jennifer Green, thank you for helping me, not only with my methodology, but also for the reminders that "it will be over soon" and an understanding ear. I truly enjoyed my dissertation process, which was something I never expected and completely attribute to having such a positive group of faculty on my committee.

The past and present faculty of this department provided me with numerous opportunities for growth and learning over the years. Without their challenge and support in and out of the classroom, I would not be where I am today.

My colleagues also deserve a big thank you for their cheerleading over the past five years. Thank you to Drs. Edith Barnett and Jeanie Kline for providing me with the flexibility to work and attend class during the beginning of my program. None of my progress would have occurred during the past two years without the support of Sandra Waters. Without a supervisor and mentor who gave me unlimited support, I could not have written this dissertation! It truly "takes a village" and my colleagues have been daily reminders of my need to keep pushing forward during this process. A special thank you to those in Distance Learning and University College who kept the faith when I lost mine along the way.

My family will need to get used to the idea that I'm not a student anymore! I am so thankful for my mother and siblings for celebrating my victories, propping me up when I was feeling low, and keeping a sense of humor when I became a "Type A" monster, consumed with my studies. My husband, Kevin, gets the biggest credit for his sacrifices and patience over the past 12 years!

I have been blessed with friends who continued to listen and smile as I explained my progress over and over again, even though I'm sure they had no idea what I was talking about. I am indebted to Gretchen Edwards-Bodmer for her daily pats on the back, laughter over lunches, and for staying "present" with me as our lives took very different directions. John and Annette Barbarise were constant reminders to keep "fun" in my life and gave me several excuses to forget about serious dissertation work and enjoy my life outside of academia. Drs. Heather Brown and Loreta Ulmer were not only inspirations for my movement towards a doctoral program, but also examples of true scholars and friends.

Rabindranath Tagore once said, "You can't cross the sea merely by standing and staring at the water." Thank you to everyone who helped me to cross.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

CHAPTER I: INTRODUCTION

As adolescents enter college, they must begin to make adjustments in daily routines, including eating and exercise habits. The college-aged years are a critical time when young adults begin to make decisions about how they will engage in healthy behaviors. There is evidence that children and adolescents benefit from physical activity and healthy eating, both in physical and mental health, as well as in academic performance (Action for Healthy Kids, 2004). For adolescents entering young adulthood, it is often a difficult and confusing time where they have to learn how to maintain healthy exercise and eating behaviors or learn how to adopt these new behaviors. Furthermore, the challenge of balancing other academic and social demands often overwhelms students and they are not able to maintain a healthy lifestyle. This study aimed to investigate any relationship that may exist between college student academic, personal-emotional, and social adjustment and the healthy habits of physical activity and nutritious eating.

Background

In the past 30 years, state funding for higher education has decreased by 30% (Ehrenberg, 2006). Assessment becomes an integral component for program survival. Often, health programming and services lose funding because they are not able to show how student services meet institutional goals and outcomes. As the college student population becomes more diverse, higher education professionals must conduct research in order to adapt and change (Steenbarger & Manchester, 1996). To make the connection between student health and the overall goal of student learning, many student affairs divisions align with academic and learning missions of the institutions (Schwitzer & Metzinger, 1998).

Increasingly, students come to college with complex mental health issues (Kitzrow, 2003). These complex issues often worsen when students do not engage in healthy behaviors,

which lead to higher levels of stress and depression. Soet and Sevig (2006) linked mental health issues to academic and social adjustment, as well as alcohol use and eating disorders. New college environments also present stress for incoming students as adolescents attempt to adjust to new living arrangements, changes in sleeping habits, increased workload, and new academic responsibilities (Ross, Niebling, & Heckert, 1999).

As students attempt to adjust to new routines as they enter college, healthy physical activity and eating habits decline. Most students do not continue the same level of physical activity that they maintained while in high school (Bray & Born, 2004; Racette, Duesinger, Strube, Highstein, & Deusinger, 2008). The U.S. Department of Health and Human Services (2000) identified higher education institutions as settings where young adults should be targets for physical activity promotion. To compliment *Healthy People 2010*, the American College Health Association created *Healthy Campus 2010*, which aimed to increase the number of students who engage in recommended levels of physical activity. In addition to low levels of physical activity, many new college students do not eat the recommended levels of fruits and vegetables (Grace, 1997). LaFountaine, Neisen, and Parsons (2006) also found that first-year college students scored well below national recommendations for healthy eating and stress management. Only 8.5% of college students eat the recommended levels of fruits and vegetables on a daily basis (American College Health Association, 2006). *Healthy Campus 2010* also charged higher education institutions to increase the number of students eating recommended fruits and vegetables.

As students enter college, they often establish behaviors that last into adulthood. Frequently, these behaviors will either help or impede adjustment into higher education. Adjustment to a new college or university impacts student success (Aspinwall & Taylor, 1992;

Gerdes & Mallinckrodt, 1994). Baker and Siryk (1984) developed a scale to measure first-year student adjustment to college, understanding that the college experience is multifaceted and the demands vary for each student. Student adjustment and the way in which students cope also differ in effectiveness (Baker & Siryk, 1986). Specifically, student adjustment to college has four components: 1) academic, 2) social, 3) personal-emotional, and 4) institutional. Rogers and Tennison (2009) found that poor adjustment to college impacts academic performance and overall health, but few studies address how physical activity and nutrition impact adjustment.

Significance and Purpose of the Study

Baker and Siryk's research in student adjustment theory is important to investigate further, specifically as it relates to areas of physical health and nutrition behavior. Knowing these two areas impact public health, colleges and universities are poised to influence students as they enter into adulthood. An investigation of the relationship between physical activity, eating behavior, and freshmen adjustment to college could provide health care professionals and higher education administrators with useful information for the education and treatment of those students entering college for the first time.

Definitions of Terms

The following terms were used during this research study:

Adjustment is a term defined by Baker and Siryk (1984 and 1986) which explains the four areas of college student adjustment, including academic, social, personal-emotional, and institutional. Academic adjustment is defined as a student having a positive attitude toward setting academic goals, completing academic requirements, the effectiveness of the student's efforts to meet these requirements, and the student's academic environment. Personal-emotional adjustment is defined by how well the student is feeling both psychologically and physically,

including any experiences of psychological distress and related physical symptoms. Social adjustment is defined as how the student is adjusting socially to his or her new college environment, including making friends, homesickness, involvement in social activities and dormitory living. Institutional adjustment which is defined as how much a student is committed to the institution, is not investigated as part of this study. Academic, personal-emotional, and social adjustment are all dependent variables in this study.

Nutrition is defined by the daily consumption of fruits and vegetables. For the purpose of this study, the national recommended levels of five servings of fruits and vegetables per day are used as a baseline for healthy eating behavior.

Physical Activity is defined as a combination of cardiovascular exercise and strength training activities. Cardiovascular activity is classified as: 1) moderate-intensity, lasting thirty minutes or longer, resulting in a noticeable increase in heart rate or 2) vigorous-intensity, lasting 20 minutes or longer, resulting in large increases in breathing or heart rate. Strength training activities can be classified as using resistance weight machines or free weights for 8 to 12 repetitions in each exercise.

Healthy and Unhealthy Behaviors are defined by activities that students engage in that may help or hurt student wellness. For the purpose of this study, physical activity and nutritious eating are healthy behaviors.

Research Questions and Hypotheses

The purpose of this study was to examine the relationship between student health behaviors physical activity and healthy eating to student adjustment, specifically academic, personal-emotional and social adjustment.

Research questions and hypotheses examined in this study were:

Question 1: To what degree does a relationship exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Hypothesis 1: A positive relationship will exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Question 2: To what degree does a relationship exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Hypothesis 2: A positive relationship will exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Question 3: Is there a significant difference between college students who meet the minimum recommended levels of physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment and those who do not?

Hypothesis 3: Students who engage in the recommended amounts of physical activity will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not engage in the recommended amounts of physical activity.

Question 4: Is there a significant difference between college students who meet the minimum daily recommendations for fruit and vegetable intake exhibit higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment?

Hypothesis 4: Students who consume the minimum daily recommendations of fruit and vegetable consumption will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not consume recommended levels of fruit and vegetables.

Overview of Methodology

The design of this study was a non-experimental *ex post facto* examination of archival data from the American College Health Association's National College Health Assessment II survey (NCHA-II). The data was from academic years 2008 and 2009. Developed in 1999, the survey has been administered for over a decade to higher education institutions. The instrument comprises 65 questions, including demographic questions about the student and the institution. Survey questions included the following topics: alcohol, tobacco and other drug use, sexual health, weight, nutrition, exercise, mental health, personal safety, and violence. The sample consisted of first-year undergraduate students who replied to the NCHA-II. All of the members of the sample were anonymous survey respondents, and no identifying information was obtained from the dataset provided. Approval to conduct this study was received from Old Dominion University's Darden College of Education Human Subjects Research Committee.

The independent variables were physical activity (aerobic and strength training activities) and nutrition behaviors (fruit and vegetable consumption). The dependent variables were academic, personal-emotional, and social adjustment responses. Using Baker and Siryk's student adjustment theory as a guideline, questions were selected from the survey which best represented the areas of academic, personal-emotional, and social adjustment. Descriptive statistics were used to identify the mode, median, mean, variance and standard deviation for each research question as appropriate. Data analysis procedures included an examination of relationships through correlation testing and inferential statistical analyses.

For the first two research questions, a correlation was used to determine if a relationship existed between a college student's physical activity behavior or nutrition behavior and his or her academic, personal-emotional, and social adjustment. For questions three and four, a MANOVA

was conducted to compare the group differences between students who met the national recommended physical activity and healthy eating guidelines and his or her adjustment to college. Cronbach's alpha was used to determine scale reliability. Table 1 details questions used from the NHCHA-II for this study.

Limitations and Assumptions

The scope of this study was limited to first-year students completing the National College Health Assessment II (NCHA-II) survey in 2008 and 2009. The NCHA-II is designed to provide higher education institutions information about their students' health behaviors and show national trends. Using this survey to infer relationships between responses extends the purpose of the instrument beyond institutional data collection and trend analysis. In addition, participation in the survey is voluntary, so results may not be generalized to a national population. This study did not attempt to examine or account for any external factors that may impact student adjustment or healthy behaviors. Creating a scale based on nominal data may not be a true reflection of student adjustment. Therefore, assumptions may be flawed. Because the survey was not designed for scaling, all items were recoded with 0 for no healthy behavior present and 1 for healthy behavior present. In addition, the survey is not designed to measure college student adjustment, therefore the assumption must be made that survey questions were used to assess this phenomenon based on the operational definitions from Baker and Siryk and the researcher's own decision to include them in the statistical analysis.

Summary

The purpose of this study was to explore the relationship between college student health behaviors and academic, personal-emotional, and social adjustment. Research suggests that adjustment to college may be the greatest predictor for academic success and retention. The

study utilized pre-existing data obtained from the NCHA-II survey and was grounded in Baker and Siryk's student adjustment theory. Study findings contribute to the greater body of knowledge pertaining to college student health and institutional retention. Finally, the results provide a foundation for further studies in college student health and college adjustment.

CHAPTER II: REVIEW OF THE LITERATURE

This chapter reviews the literature and illustrates the need for increased research in college student health, specifically in the areas of adjustment, physical activity, and nutrition. Adjustment to college is of particular interest to higher education as it impacts retention. Institutions are constantly trying to find ways to retain students and improve graduation rates. Research in adjustment to college will be connected to college student health: physical activity and nutrition. While these two areas of student health are well-documented in relation to academic achievement in elementary and secondary students, they are not as well-studied in higher education, as illustrated in this chapter.

Research in College Student Health and Impact on Higher Education

College health professionals continue to respond to the demand for greater accountability and assessment of student health programming and service outcomes. Several constituencies request this information, ranging from college and university administrators, professors and staff, students, and professional or government organizations. With the increased budget cuts facing many higher education institutions, these professionals must provide outcome information to a wider audience of stakeholders than they have done in the past.

Overall declines in budget, state funding, and public support force higher education institutions to reallocate resources by conducting cutbacks in selected areas. Many times, these reductions occur in the areas of student services and support. To make these decisions, institutions turn to assessment as a way to determine which departments or service areas meet institutional goals and outcomes. Student health has been forced to emphasize educational and developmental outcome goals through assessment and planning practices. As this budget trend

continues, student health programs and services will face even greater pressure to demonstrate contributions to the institution's student outcome goals.

As college health practitioners look towards new assessment practices, they recognize that the college student population is very complex and increasingly diverse. While there is a large body of research available regarding college student health, continued effort must occur for health centers to remain viable entities on campus and for the knowledge base of student health to grow. Research permits higher education to adapt to student needs as student demographics change (Steenbarger & Manchester, 1996). Health professionals must make decisions based on sound research, but their worth and expertise is determined by medical, not research skills. Institutions must also understand how students perceive credible sources of information and how that phenomenon influences health education (Lindsey, 1997). In order to connect the value of student health services to the bigger picture of institutional mission, many health centers have moved towards viewing student health care as a part of the overall goal of student learning. Aligning student affairs divisions with academic and learning missions demonstrates a connection in the undergraduate experience (Schwitzer & Metzinger, 1998).

Pascerella (2006) suggested that although higher education has invested a large amount of time researching college students, only a small amount of the larger research body actually addresses how college impacts students. Increases in student diversity underline the need to learn how many of the college health interventions affect varied populations. In addition, little is know about why interventions work in college student health, as most research estimates how an intervention impacts students.

As student health needs change, colleges and universities must treat more complex mental and physical health issues, in addition to finding ways to connect health services and

student learning. College counseling centers have to move beyond developmental and preventative counseling and into more complex psychological counseling. Students come to college with increasingly complex psychological problems and life issues (Kitzrow, 2003). Increases in student suicide rates, hospitalization for mental disorders, and use of psychiatric medication present new treatment challenges. Soet and Sevig (2006) linked depression to college student functioning and behaviors, including alcohol use, academic success, eating disorders, and social interactions. Stress continues to be one of the greatest emotional challenges for new college students, with most students reporting that changes in sleeping habits, vacations, changes in eating habits, increased work load, and new responsibilities all contribute to uncontrollable stress in college (Ross, Niebling, & Heckert, 1999). Seventy-six percent of college students cite poor sleep quality, which has been linked to fighting, suicidal ideations, smoking, and alcohol use (Vail-Smith, Felts, & Becker, 2009). A possible reason for the increase in mental health issues is that students are coming to college with more life issues, including divorce, family issues, drug use, and other personal crises. The majority of counseling centers struggle to meet the increased student demand for help. Institutions look to research in this area to understand how psychological issues impact student retention, academic performance, and campus environment.

The college-aged years usually present a time in an individual's life where health priorities are established, and poor habits worsen during this time (Grace, 1997). Compared to the general population, college students typically visit health centers less frequently and choose to delay treatment (Patrick, Grace, & Lovato, 1992). As health habits worsen, colleges and universities are often left wondering how these behaviors impact academic performance. Many choose to focus research efforts on alcohol consumption, due to the public health concerns of

alcohol abuse in young adults (Ham & Hope, 2003). The U.S. Department of Health and Human Services, National Institute of Health, and National Institute on Alcohol Abuse and Alcoholism (2007) found that 19% of college students aged 18-24 years met the criteria from the DSM-IV for alcohol abuse or dependence. Between 1998 and 2001, the national rate of college student deaths related to alcohol increased from 1600 to 1700 students, DUI's increased from 26.5% to 31.4% and more than 500,000 students were unintentionally injured as a result of drinking (Hingson, Heeren, Winter, & Weschsler, 2005). In 2002, Wechsler, Lee, Nelson, and Kuo reported that binge drinking behavior was of particular concern to colleges and universities. They found that between 1993 and 2001, the percentage of underage student drinking went from 81% to 77.4%. This was a small decrease, considering the large efforts to decrease this phenomenon through programming and educational services on campuses. Approximately two in five college students engage in binge drinking behaviors, and almost 44% of those students are under the legal drinking age (Wechsler, et al., 2002).

Lifestyle habits account for almost 50% of the mortality in the United States. College is an important time when students establish healthy and unhealthy behaviors (Pearman, Valois, Sargent, Saunders, Drane, & Macera, 1997). Researchers view this time period as an opportunity to address how postsecondary institutions affect these behaviors. Because many habits are set in late adolescence, colleges often stress educational programming for new students. Many institutions implement health or physical activity courses, which assist in the development of health behaviors, knowledge and attitudes (Pearman, et al. 1997). For institutions without such required coursework or programming, college health centers and counseling centers are often left to provide services to educate young adults about healthy behaviors.

Hailey, Pargeon, and Crawford (2000) found that one of the missing areas in college health education and services is the process of assessing student satisfaction within health centers. By looking at student needs, health centers can determine how to improve services and make decisions about how to better meet the needs of diverse student populations. With healthcare reform changes occurring nationally, student health centers must also address how they can continue to be viable healthcare providers (Mills & Gold, 1996). Warner (1995) suggested that in order to manage changes, student health centers need to clarify their mission statements and use these mission statements as guides for decision making, development of organizational culture, and support for responsible action. Mission statements also serve as a means for health services to show institutions their worth and educate students about services. After mission statements are established, health centers should assess patient satisfaction as a part of quality management (Dansky, Colbert, & Irwin, 1996). Focus groups and interviews are rarely used in college health center research practice, but should be as they provide valuable feedback about student beliefs, attitudes, knowledge and priorities (Stephenson, 1999).

Accountability for student learning outcomes is increasing, and often times, funding is attached to assessment outcomes (Guskin, 1997). Health services offices are challenged by lack of funding and increased student needs. Student demands for more complicated health care also force institutions to maintain services at a reasonable cost, due to the higher level of services needed to treat more complex health issues (Brindis & Reyes, 1997). State mandates also force assessment of student outcomes as funding decreases and demand for programming increases (Ewell & Boyer, 1988). Steenbarger and Manchester (1996) suggested that many college health professionals do not engage in the research process because there is little incentive to do so. Many health professionals are not trained in research practice and may not know how to conduct

research. One area of particular concern is the validity of conducting research in this area, as assessment of health-risk behaviors is affected by both cognitive and situational factors (Brener, Billy, & Grady, 2003). It is essential to continue to conduct new research in college student health to understand how to meet the needs of diverse students and emerging health issues.

College Student Health

Physical Activity

The transition from high school to college marks a time in an adolescent's life when major changes occur in personal health behaviors. Most students do not continue previous physical activity patterns once they go to college (Racette, Duesinger, Strube, Highstein, & Deusinger, 2008). Gyurcsik, Bray, and Brittain (2004) reported that 47% of first year students do not meet the recommended amounts of moderate physical activity guidelines, mostly due to institutional, interpersonal, intrapersonal reasons and lack of motivation. Bray and Born (2004) suggested that high school seniors entering into the freshman year of college decrease physical activity by about 20%. Studies have produced conflicting evidence regarding the amount of change in physical activity between the first and second year of college. Pinto, Cherico, and Szymanski (1998) did not find any difference in activity levels but did reveal that a sizable group (42%) of students were either inactive or exercising below the recommended levels of physical activity during the freshman year. Various studies indicate that a high portion of college students' physical activity levels remain below the recommended standards and may decrease as the students age (Huang, Harris, & Lee, 2003; Racette, Deusinger, & Strube, 2005). Inconsistencies of physical activity measures may also make it difficult to compare college student patterns of exercise (Keating, Guan, Pinero, & Bridges, 2005). Inconsistencies of

findings related to living arrangements should be investigated as well, as Brevard and Ricketts (1996) found no differences in exercise habits between students living on or off-campus.

Overall, research shows that college students exercise well below recommendations. Furthermore, between the freshman and senior years of college, the percent of students classified as overweight or obese increase from 15% to 23% (Racette et al., 2008). *Healthy People 2010* identified postsecondary institutions as settings where young adults, aged 18 to 24, should be targeted for physical activity promotion (U.S. Department of Health and Human Services, 2000). To supplement *Healthy People* 2010, the American College Health Association created *Healthy Campus* 2010, which aimed to increase the number of college students who engage in moderate physical activity to at least three times per week. However, there is evidence that college students do not understand the recommendation levels for moderate physical activity (McArthur & Raedeke, 2009). Behrens, Dinger, Heesch, and Sisson (2005) found that while college students understood the definition of physical activity, most were not sure about the specific frequency and duration required to meet the recommendations for moderate physical activity levels. Zahran, Zack, Vernon-Smiley, and Hertz (2007) discovered that as the educational level of the college student increased, the amount of exercise decreased in 18-24 year-old students. Haberman and Luffey (1998) found that 39% of students reported exercising three or more times a week, whereas 12.3% of students reported not exercising at all. Driskell, Young-Nam, and Goebel (2005) revealed that 48% of students reported not engaging in resistance training, one of the recommendations for physical activity for adults, but did engage in aerobic activity, such as walking.

There may be gender differences regarding exercise behaviors in college students. Female college students tend to exercise less than male students (Buckworth & Nigg, 2004;

Hudd, Dumlao, Erdmann-Sager, Murray, Phan, Soukas, & Yokozuka, 2000; Jung, Bray, &Ginis, 2008; Suminski, Petosa, & Utter, 2002; Taeho, Heewon, & Gordon, 2008; Tam, Martinez, Tsai, Chang, Calderon, Davis, & Yeh, 1996). Lowery, Robinson-Kurpius, Befort, Blanks, Sollenburger, Nicpon, and Huser (2005) reported that differences may due to poor body image in female students. Concern with weight motivates many female students to exercise, but not for healthy reasons. Rather, they often exercise for bodily control and image improvement (Kilpatrick, Hebert, & Bartholomew, 2005). Stress may also play a part in lower activity levels in female college students. Stressed students tend to not practice healthy behaviors, and female students are more likely to feel stressed (Hudd, et al., 2000). Due to lower levels of exercise, female students tend to gain more weight than male students in the first two years of college (Lloyd-Richardson, Bailey, Fava, Wing, & the Tobacco Etiology Research Network, 2009; Edmonds, Ferreira, Nikiforuk, Finnie, Leavey, & Duncan, 2008).

There may be a relationship between diet and physical activity levels in college students. Seo, Nehl, Agley, and Ma (2007) found that consumption of fruit may be an indicator of health consciousness or behavior among college students. As students move through stages of positive health behavior change, diet and exercise were found to be linked behaviors in adolescents entering college (Horneffer-Ginter, 2008). More research is needed to investigate the link between the two health behaviors (Keating et al., 2005). Jung et. al (2008) discovered that living on campus is associated with inactivity, but Dinger (1999) found that students living in residence halls or Greek housing exercised more. Furthermore, Hermon and Davis (2004) revealed that traditional-aged students were more engaged in physical activities than non-traditional aged students.

Physical Activity Benefits

Physical activity facilitates information processing in adults (Brisswalter, Collardeau, & René, 2002; Tomporowski, 2003). College students who snack in late afternoon perform better on cognitive tasks after consuming more nutritious foods (Kanarek & Swinney, 1990). In contrast, Johnson, O'Brien, and Dahlke (2006) found that exercising before exams does not improve cognitive performance. Higher levels of physical activity also have been shown to be associated with higher levels of healthy eating by college students (Hendricks, Herbold, & Fung, 2004; Jorm, Anstey, Christensen, & Rogers, 2004; Lake, Townshend, Alvanides, Stamps, & Adamson, 2009).

In addition to the possible cognitive performance improvements, physical activity also helps college students maintain a healthy state of mind (Trockel, Barnes, & Eggett, 2000). Kashihara, Maruyama, Murota, and Nakahara (2009) discovered that over exercising may impede cognitive functioning. However, exercise clearly improved mood states, which may facilitate positive cognitive functioning, even in an indirect way. Students who exercise more frequently have more positive perceptions of their environment and thus choose to eat healthier and take better care of themselves (Boyle & LaRose, 2008). Bray and Kwan (2006) also found that students who exercised more frequently during the freshman year tended to report higher levels of well-being and had fewer illnesses than students who were not sufficiently active. Students who exercise more frequently also report improved perceptions of physical appearance, resulting in fewer body image issues (Grubbs & Carter, 2002). Taliaferro, Rienzo, Pigg Jr., Miller, and Dodd (2008) noted motivation to exercise may be negative in nature when students are trying to lose weight in an unhealthy way, but overall, aerobic activity was associated with a reduced risk of hopelessness, depression and suicidal behavior. Thome and Espelage (2004) agreed with the possibility of negative motivation for exercise, citing that females with eating

pathology had higher levels of depression, anxiety and desire to exercise, but male students who exercised tended to have more positive levels of psychological health. Problem-solving skills may also be linked to higher levels of physical activity and reduction in stress experiences (Largo-Wight, Peterson, & Chen, 2005). Elliot, Johnson, and Jackson (1997) suggested that this may be due to the fact that students who exercise more have higher levels of confidence; they believe they can be successful in the face of impediments.

Nutrition

As introduced in *Healthy People 2010*, the *Healthy Campus 2010* publication states that colleges and universities should strive to increase the number of students who consume five servings of fruits and vegetables per day (U.S. Department of Health and Human Services, 2000). College students exhibit a low level of awareness of the three areas related to the 2000 Dietary Guidelines for American and the Food Pyramid. These areas include food composition, healthy eating and the relationship between diet and health (McArthur, Grady, Rosenberg, & Howard, 2000). In comparison to the general population in the United States, first-year college students score the lowest on wellness scales for nutrition and stress management (LaFountaine, et al., 2006). Grace (1997) found that in comparison to the general population, college students' eating habits often worsen during college, rather than improving during this formative stage of life.

In 2008, the American College Health Assessment surveys revealed that 8.5% of students reported eating five or more servings of fruit and vegetables daily (American College Health Association, 2009). Other studies showed very few students meet the recommended servings for fruits and vegetables (Hiza and Gerrior, 2002; Plesko, Cotunga, & Aljadir, 2000; Song, Schuette, L.K., Huang, & Hoerr, 1996). Johnson, Nichols, Sallis, Calfas, and Hovell (1998) found that in

senior-level college students, eating healthy foods was significantly related to physical activity variables, and indicated that physically active students were more likely to eat fruits and vegetables. Adams and Colner (2008) suggested that certain students groups eat less fruits and vegetables, including single students, African American students, Hispanic students, and part-time enrolled students. Nelson and Story (2009) also found that four-year college students ate more fruit and vegetables than 2-year college students and non-students, however, they still consumed more than three servings below the recommended amounts. Overall, research shows that college students lack in healthy food consumption levels (Huang et. al, 2003; Racette et. al, 2005).

Male and female college students report different levels of fruit and vegetable consumption, as well as reasons for eating behaviors. College students between the ages of 18-24 show high participation levels in dieting behaviors. Lowry, Galuska, Fulton, Wechsler, Kann, and Collins (2000) found that 35% of students they surveyed believe they were overweight or obese, and of those students, 46% tried to lose weight. In addition, they were more likely to eat more fruits and vegetables. Over half of women and 25% of men diet in college (Peters, Amos, Hoerr, Koszewski, Huang, & Betts, 1996). Furthermore, 17.4% of female and 10.4% of male students report that they feel that weight or concerns about eating interfere with academic performance (Hoerr, Bokram, Lugo, Bivins, & Keast, 2002). Female college students tend to restrict caloric intake and eat more fruits and vegetables in an attempt to lose weight (Butler, Black, Blue, & Gretebeck, 2004; Chung, Hoerr, Levine, & Coleman, 2006; Economos, Hildebrandt, & Hyatt, 2008; Gerand, 2009; Soriano, Moltó, & Mañes, 2000). Other research reveals conflicting evidence of these behaviors. Cullen, Koehly, Anderson, Baranowski, Prokhorov, Basen-Engquist, Wetter, and Hergenroeder (1999) found that in the transition from

high school to college, females reported consumption of few servings of fruit, but fruit consumption declined for both genders. Anding, Suminski, and Boss (2001) reported in their study that 5% of female college student surveyed complied with Food Pyramid recommendations for consuming grains, fruits, and vegetables. There may be a relationship between race and eating behavior, as suggested by Aruguete, DeBord, Yates, and Edman (2005). In their research, Caucasian students reported that they were more dissatisfied with their bodies and dieted more than African-American students, eating higher amounts of fruits and vegetables.

There is some evidence that living arrangements may also influence college students' eating behaviors and healthy food choices. Brunt and Rhee (2008) found that college students who lived on campus consumed larger variety of fruits, vegetables, and dairy products than those who lived off campus. Adams and Colner (2008), as well as Chung and Hoerr (2005), found that students in residence halls reported greater fruit and vegetable intakes. Meal plans may be the reason for the increased healthy food options, as suggested by Brown, Dresen, and Eggett (2005). However, there is conflicting information about Greek housing and healthy eating. Dinger (1999) found that students living in Greek housing consumed fewer servings of fruits and vegetables, while Adams and Colner (2008) found that students living in Greek housing consumed more fruits and vegetables than a student living in non-Greek off-campus housing. In addition to meal plans available in residence halls, students often keep a variety of foods in their rooms. Parents of these students also send more snack items, which typically are not as healthy as what the students would have selected for themselves (Nelson & Story, 2009).

Fast food appears to be a staple for most college students. Morse and Driskell (2009) reported that most undergraduate college students eat at a fast food restaurant one to three times a week. The same students surveyed reported that they ate breakfast, lunch, and dinner at a

university cafeteria 43% of the time. Driskell, Meckna, and Scales (2006) reported similar findings, as their surveys showed that 89% of college students ate lunch at a fast food restaurant at least once a week, and more than 29% ate non-meal snacks at a fast food restaurant at least once a week. Many students do not vary in food choices, as Haberman and Luffey (1998) found that 76% of students ate the same foods day after day. Soft drink consumption tends to be higher in students who do not eat healthy foods, especially in males (Schenkel, Stockman, Brown, & Duncan, 2007). Students who consumed more fast food typically exercised less and had higher food expenditures because they did not prepare healthy meals in advance to bring to campus during class times (Jackson, Berry, & Kennedy, 2009).

Some students cited cost of fruit (deBruijn, 2010) or taste as a reason for low fruit intake, indicating that it would not be too difficult to add in one more daily serving of fruit (Shive & Morris, 2006). Other students explained that stress prevents them from practicing healthy habits, such as eating fruits and vegetables (Hudd et. al, 2000). Using marketing and educational campaigns, colleges and universities have found success with increasing the amount of fruits and vegetables students consume. Richards, Kattelman, and Ren (2006) found that after four months of educational interventions, students increased fruit and vegetable consumption by at least one serving per day, compared to the control group. Shive and Morris (2006) noted significant increases in fruit intake after a social marking campaign. Finally, by providing nutritional information in university dining halls, students reported that they made better food choices and selected more fruits and vegetables with meals (Driskell, Schake, & Detter, 2008).

Nutrition Benefits

Little research has been conducted to show the benefits of healthy eating as it relates to college students' academic performance and well-being. George, Dixon, Stansal, Gelb, and

Pheri (2008) maintain that healthy diet plays a surprisingly powerful role as a predictor of success in college students. Eating breakfast may be one factor in improving academic performance, as seen in the study conducted by Trockel et. al (2000) which showed that students who ate breakfast achieved a higher first-year college grade point average. Students who were more active also tended to not skip breakfast, linking health behaviors of physical activity and nutrition (Blair, Jacobs, & Powell, 1985). Cognitive performance may or may not be improved based on diet. Fischer, Colombani, Langhans, and Wenk (2002) found that males tended to present better overall cognitive performance on tests after eating breakfast. However, Benton, Slater, and Donohoe (2001) found that female students did not show the same recall or cognitive improvements on tests after eating breakfast, but those who did not skip breakfast appeared to be more motivated in trying to make an effort on their test.

College Student Adjustment

Emerging young adulthood is a critical time in a college student's life. It is a time when they establish independence and adopt lasting behaviors. Adjustment to a new college or university impacts student success (Aspinwall & Taylor, 1992; Gerdes & Mallinckrodt, 1994). Social and emotional factors are proven to impact student adjustment to college (Holmbeck & Wandrei, 1993; Kerr, Johnson, Gans, & Krumrine, 2004; Pritchard & Wilson, 2003). Baker and Siryk (1984) developed a scale to measure freshman student adjustment to college, understanding that the college experience is multifaceted and the demands vary for each student. The way a student copes to these demands also vary in effectiveness based on the area of adjustment (Baker & Siryk, 1986). The four areas of adjustment on this scale include: 1) academic, 2) social, 3) personal-emotional, and 4) institutional.

Each subscale of adjustment includes several questions which gives students the opportunity to reflect on themselves and their surroundings. The academic adjustment subscale assesses students' attitudes towards academic goals and the work they are required to do in and out of the classroom. In addition, students evaluate how well they have been applying themselves to their academic work, how effective academic efforts have been, and the acceptability of the academic environment and its offerings to the student. The social adjustment subscale addresses the student's opinions of social activities, social environment, and interpersonal relationships. The last subscale of personal-emotional adjustment asks students to reflect on how they feel both physically and psychologically.

In Baker and Siryk's first evaluation of the adjustment scales, they found that freshman adjustment was best measured by variables of attrition, psychological services requests, grades, honors society election, and social activities. The personal-emotional subscale was found to correlate the highest to end of freshman year grade point average (Baker & Siryk, 1984). After further studies, Baker, McNeil, and Siryk (1985) recognized that the scales were sensitive to students' internal and external experiences in college as they attempt to make adjustments. Rogers and Tennison (2009) agreed with Baker and Siryk's adjustment theory, citing that adjustment difficulties can manifest as symptoms of adjustment disorder- symptoms including anxiety, depression and homesickness.

Academic performance and health are often impacted, as a result of poor adjustment to college (Rogers & Tennison, 2009). Nelson et. al (2008) recognized that changes in diet, physical activity and weight gains or losses during this time of transition can adversely impact chronic disease risk and prevention. Undergraduates define success based on grades, their degree of social interaction, and perceived ability to navigate the college environment

(Yazedijan, Toews, Sevin, & Purswell, 2008). Martin, Swartz-Kulstad, and Madson (1999) added in their findings that students who believe that they are receiving adequate support from their environment tend to do better in terms of adjustment to college. Friedlander, Reid, Shupak, and Cribbie (2007) found that higher levels of social support, better self-esteem, and lower levels of stress are related to better adjustment in the first semester of college.

Summary

The college-aged years are a critical time when young adults begin to make decisions about how they will engage in healthy behaviors. There is evidence that children and adolescents benefit from physical activity and healthy eating, both in physical and mental health, as well as in academic performance. For adolescents entering young adulthood, it is often a difficult and confusing time where they have to learn how to maintain healthy exercise and eating behaviors or learn how to adopt these new behaviors. Furthermore, the challenge of balancing other academic and social demands often overwhelms students and they are not able to keep up with a healthy lifestyle.

Based on the research reviewed in this chapter, this study aimed to investigate any relationship that may exist between student adjustment and the healthy living habits of physical activity and nutritious eating. Prior studies show that physical activity and nutrition behaviors can change dramatically when students enter college. By understanding how these changes may impact student adjustment, higher education can be better informed to research and implement programming and education in these areas.

CHAPTER III: METHOD

The purpose of this non-experimental study was to examine possible relationships between college student health behaviors and student adjustment theory, specifically physical activity and nutrition. Baker and Siryk's student adjustment theory was used as the theoretical framework for this study, due to its proven validity and reliability in student adjustment research. This research utilized the National College Health Assessment II (NCHA-II) survey, administered by the American College Health Association. This study also explored the possible adjustment differences between students who met or did not meet national recommendations for physical activity and nutrition standards. This chapter describes the methodology of the study, including the process in survey question selection relating to student adjustment theory, a description of the survey, survey item scaling, procedures for data collection, the data analysis, and limitations of the study.

Research Design

The design of this study was a non-experimental *ex post facto* examination of archival data from the academic years 2008 and 2009. The American College Health Association's NCHA-II (see Appendix C) was used in this study for data collection purposes, which has been administered for over a decade to higher education institutions. The instrument comprises 65 questions, including demographic questions about the student and the institution. Survey questions include the following topics: alcohol, tobacco and other drug use, sexual health, weight, nutrition, exercise, mental health, personal safety, and violence. For the purpose of this study, only a selected number of questions were used as they related to the independent and dependent variables.

Research Questions and Hypotheses

Research questions and hypotheses examined in this study included:

Question 1: To what degree does a relationship exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Hypothesis 1: A correlation will exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Question 2: To what degree does a relationship exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Hypothesis 2: A correlation will exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Question 3: Is there a significant difference between college students who meet the minimum recommended levels of physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment and those who do not?

Hypothesis 3: Students who engage in the recommended amounts of physical activity will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not engage in the recommended amounts of physical activity.

Question 4: Is there a significant difference between college students who meet the minimum recommended amounts of fruit and vegetable intake exhibit higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment than those who do not?

Hypothesis 4: Students who consume the recommended amounts of fruit and vegetable intake will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not engage in the recommended amounts

of fruit and vegetable intake.

Participants

The sample consisted of 37,564 first-year undergraduate students who responded to the National College Health Assessment II, ranging in years from 2008 to 2009. A description of the sample sizes and demographic characteristics is reported in Chapter 4. All of the members of the sample were anonymous survey respondents, and no identifying information was obtained from the dataset provided. The following data was obtained for students within each group as applicable: student type, demographic characteristics, institution characteristics, physical activity and nutrition behaviors, as well as academic, personal-emotional, and social adjustment responses.

Measures and Data Collection

The National College Health Assessment II (NCHA-II) surveys from 2008 through 2009 were used to collect the data needed to answer the research questions. The survey was selected as the primary data source for this study due to the national scope of inquiry, as well as the broad range of topics on the survey, including physical health, emotional health, academic success, and student perceptions about their wellness (see Appendix C for survey sample). In order to obtain the datasets from the American College Health Association, a data use request form was submitted to the organization.

The NCHA-II database is comprised of responses from randomly selected students in randomly selected classrooms. Due to the voluntary participation from institutions, the responses from first-year students may not be generalized to the entire population of college student freshmen. However, according to the American College Health Association (ACHA), generalizability exists based on the three ACHA-NCHA-II pilot studies. The Spring 2000

database was evaluated by comparing the results to other surveys of the same population that have been sampled to represent all students in the United States.

In order to evaluate reliability and validity, the ACHA triangulated the NCHA-II data with several other national databases. The triangulation process was used to demonstrate the reliability and validity of the ACHA-NCHA-II, and thus its utilization and its ability to represent the population of students. The databases used for this analysis included: National College Health Risk Behavior Survey CDC (1995), Harvard School of Public Health (1999) College Alcohol Study (CAS), United States Department of Justice: The National College Women Sexual Victimization Study (2000), ACHA-National College Health Assessment I (1998), Spring 1999 and Fall 1999 Pilots, and ACHA-NCHA-I (Spring 2000).

Pilot reference group data were subjected to Principal Component Factor Analysis and Reliability Analyses. The Principal Components Analysis determined groups of items which were related and provided structure for conducting the Reliability Analysis. Using 2008 NCHA-II data, the Principal Component Analyses were conducted and components with Eigen values over 1 were identified, which indicated that a particular component/factor solution was acceptable. Each of these components was then subjected to a Reliability Analysis to produce Standardized Alpha and the average inter-item correlation statistics. The ACHA used .7 as a considerably reasonable Standardized Alpha score for the purpose of forming the scale. Focusing on multiple groups of items under various topic areas, the Reliability Analysis was used to determine a Standardized Alpha score and to determine if the items in the group would work well as a scale. Reliability analyses showed moderate to strong results in grouped or scaled items. When repeated, these same strong consistencies existed over 2007 and 2008 pilot testing. Construct validity analyses used the same items that were subject to the Reliability Analyses.

Over the same two survey periods, different colleges and universities showed consistency in the magnitude and direction of Kendall's tau b test. Overall, the NCHA-II is both reliable and valid, but not every item on the survey was analyzed or appropriate for scaling. As appropriate, a majority of items on the survey were systematically evaluated for validity and reliability purposes.

Adapting Measure for Current Study

For the purpose of this study, questions were used from the survey as they relate to the independent and dependent variables of the study. Table 1 includes the questions which were used for data analysis purposes, as well as variable information and adjustment type information. In addition, all demographic questions were used in order to provide specific sample responses.

As discussed earlier, the independent variables in this study included physical activity and nutritional fruit and vegetable intake. Physical activity is defined as a combination of cardiovascular exercise and strength training activities. Cardiovascular activity is classified as: 1) moderate-intensity, lasting thirty minutes or longer, resulting in a noticeable increase in heart rate or 2) vigorous-intensity, lasting 20 minutes or longer, resulting in large increases in breathing or heart rate. Strength training activities can be classified as using resistance weight machines or free weights for 8 to 12 repetitions in each exercise. Baker and Siryk's (1984 and 1986) four-point adjustment model were used to as a framework to select questions that comprised the dependent variables for this study. Specifically, questions on the survey were selected as they related academic, personal-emotional, and social adjustment.

Baker and Siryk define college student academic adjustment as the student having a positive attitude toward setting academic goals, completing academic requirements, the effectiveness of the student's efforts to meet these requirements, and the student's academic

environment (course satisfaction and variety, professor satisfaction, performance, and motivation). Questions from the NCHA-II survey that addressed academic adjustment included the following:

#33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (academics)?

#63: What is your approximate cumulative GPA?

#45: Within the past 12 months, have any of the following affected your academic performance?

Personal-emotional adjustment is defined by how well the student is feeling both psychologically and physically, including any experiences of psychological distress and related physical symptoms. Questions from the NCHA-II survey that addressed personal-adjustment included the following:

#1: How would you describe your general health?

#18: Within the past 12 months, have you taken any prescription drugs that were not prescribed to you?

#26: How would you describe your weight?

#30: Have you ever felt emotions that were _____?

#31: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing emotional disturbances)

#33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (personal health issue, family problems, and sleep difficulties)?

#37: Within the last 12 months, how would you rate the overall level of stress that you have experienced?

#41: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing physical illnesses)

#45:Within the last 12 moths, have any of the following affected your academic performance (anxiety, concern for a troubled friend or family member, depression, eating disorder problem, sleep difficulties, stress, homesick)?

Social adjustment is defined as how the student is adjusting socially to his or her new college environment, including making friends, homesickness, involvement in social activities and dormitory living. Questions from the NCHA-II survey that addressed personal-adjustment included the following:

#33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (intimate relationships, other social relationships)?

#45:Within the last 12 moths, have any of the following affected your academic performance (participation in activities, relationship difficulties, roommate difficulties)?

Table 1

Survey Questions Used for Data Collection

Item	Question Text	Category	Variable Type
1	How would you describe your general health?	Personal-emotional	Dependent
18	Within the last 12 months, have you taken any of the following prescription drugs that were not prescribed to you?	Personal-emotional	Dependent
26	How would you describe your weight?	Personal-emotional	Dependent
28	How many servings of fruit and vegetables do	Nutrition	Independent

	you usually have per day?		
29	On how many of the past 7 days did you:	Physical Activity	Independent
30	Have you ever:	Personal-emotional	Dependent
31	Within the past 12 months, have you been diagnosed or treated by a professional for any of the following?	Academic and Personal-emotional	Dependent
33	Within the last 12 months, have any of the following been traumatic or difficult for you to handle?	Academic, Personal-emotional, and Social	Dependent
37	Over the last 12 months, how would you rate the overall level of stress you have experienced?	Personal-emotional	Dependent
41	Within the last 12 months, have you been diagnosed or treated by a professional for any of the following?	Personal-emotional	Dependent
45	Within the last 12 months, have any of the Following affected your academic performance?	Academic, Personal-emotional, Social	Dependent
46	How old are you?	Demographic	
47	What is your gender?	Demographic	
50	What is your weight in pounds?	Demographic	
51	What is your year in school?	Demographic	
52	What is your enrollment status?	Demographic	
53	Have you transferred to this college or university in the last 12 months?	Demographic	
54	How do you usually describe yourself?	Demographic	
55	Are you an international student?	Demographic	
56	What is your relationship status?	Demographic	
57	What is your marital status?	Demographic	
58	Where do you currently live?	Demographic	

63	What is your approximate cumulative grade average?	Academic	Dependent
64	Within the last 12 months, have you participated in organized college athletics at any of the following levels?	Demographic	
65	Do you have any of the following disabilities or medical conditions?	Demographic	

Data Analysis

Using Baker and Siryk's student adjustment theory as a guideline, questions were used from the survey which best represent the areas of academic, personal-emotional, and social adjustment. A table of the variables and associated questions is included in Appendix B. The survey questions did not have consistent scaling between items, so responses were coded to a 2-point scale, ranging from 0 to 1. A score of 0 indicated a non-healthy or non-present response and a score of 1 indicated a healthy or present response. Descriptive statistics were used to identify the mode, median, mean, variance and standard deviation for each research question as applicable. The quantitative data analysis procedures included an examination of relationships through correlation testing and inferential statistics including Multivariate Analysis of Variance (MANOVA).

For the first two research questions, a correlation was used to determine if a relationship exists between a college student's physical activity behavior or nutrition behavior and his or her academic, personal-emotional, and social adjustment. Questions on the survey included physical activity behaviors: moderate-intensity and vigorous-intensity cardio or aerobic exercise per week, as well as strength training exercises. In addition, the survey included questions related to healthy eating behaviors: servings of fruits and vegetable consumed per day. For questions three

and four, a MANOVA was conducted to compare the group differences between students who met the national recommended physical activity and healthy eating guidelines and their adjustment to college. When significant differences were found, Cronbach's alpha was used to determine test reliability and item relationship.

Ethical Protection of Participants

This study involved research activities presenting no more than minimal risk to human subjects and was classified as exempt under federal regulations 45CFR46.101(b). Human Subjects approval was received from the Old Dominion University Darden College of Education's Human Subject Research Committee and is found in Appendix A. The American College Health Association recoded all individual student responses with numeric identifiers on the dataset to ensure that student responses remained anonymous. In addition, the dataset did not reveal any names of institutions participating in the survey. Data for this research was retained on a laptop computer with an encrypted password and stored in a secured location with no outside access opportunities from non-project investigators. All survey data analyses files will be destroyed one year after completion of the research.

Limitations and Assumptions

The scope of this study was limited to first-year students completing the National College Health Assessment II (NCHA-II) survey in 2008 and 2009. The NCHA-II is designed to provide higher education institutions information about their students' health behaviors and show national trends. Using this survey to infer relationships between responses extends the purpose of the instrument beyond institutional data collection and trend analysis. In addition, participation in the survey is voluntary, so results from this study may not be generalized to a national population. This study did not attempt to examine or account for any external factors

that may impact student adjustment or healthy behaviors. Due to the nominal and ordinal categories on the survey, the development of a scale to statistically analyze the responses also creates the possibility of error in inferring relationships and significant differences between groups. Because the survey was not designed for scaling, all items were recoded with 0 for no healthy behavior present and 1 for healthy behavior present. In addition, the survey is not designed to measure college student adjustment, therefore the assumption must be made that survey questions were used to assess this phenomenon based on the operational definitions from Baker and Siryk and the researcher's own decision to include them in the statistical analysis.

Summary

The purpose of this study was to explore the relationship between college student health behaviors and academic, personal-emotional, and social adjustment. The study utilized pre-existing data obtained from the NCHA-II survey and was grounded in Baker and Siryk's student adjustment theory. Study findings contribute to the greater body of knowledge pertaining to college student health and institutional retention. Finally, the results provide a foundation for further studies in college student health and college adjustment. All findings from this study will be shared with the American College Health Association. Results of the analyses can be found in the following chapter.

CHAPTER IV: RESULTS

The purpose of this study was to examine possible relationships between student adjustment theory and college student health behaviors, specifically physical activity and nutrition. In addition, the results provide knowledge about possible adjustment differences between students who meet or do not meet national recommendations for physical activity and nutrition standards. This chapter provides a profile of the survey respondents and results of the analyses conducted for each research question, testing the following hypotheses:

Hypothesis 1: A positive correlation will exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Hypothesis 2: A positive correlation will exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment.

Hypothesis 3: Students who engage in the recommended amounts of physical activity will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not engage in the recommended amounts of physical activity.

Hypothesis 4: Students who consume the recommended amounts of fruit and vegetable will exhibit statistically significant higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment compared to students who do not consume recommended amounts of fruits and vegetables.

Profile of Study Respondents

The National College Health Assessment II (NCHA-II) survey responses from 2008 through 2009 were used for data collection purposes. Appendix C includes a sample of the NCHA-II survey. The American College Health Association provided the dataset, which

included 144,213 respondents. The sample used for this study included 37,564 freshmen (first-year) student responses. Because Baker and Siryk's adjustment theory addresses only first-year students, all other student levels were excluded in the data analysis. Table 2 shows a summary of the characteristics of the freshmen who completed the survey.

Table 2

Characteristics of Participants

Type of Demographic	Total Responses	Percentage
Gender		
Male	21455	57.1
Female	13030	34.7
Transgender	50	<0.1
Did not respond	339	.01
Ethnicity		
African-American	3457	13.0
Caucasian	26869	72.0
Hispanic/Latino	2980	8.0
Asian or Pacific Islander	3898	10.0
Other	360	1.0
International Students	2830	8.0
Relationship Status		
Single	34404	91.6
Married/Partnered	1553	4.1
Separated	92	0.2
Divorced	202	0.5
Other	1062	2.8
Did not respond	251	0.7
Residence Type		
Campus residence hall	27809	74.0
Fraternity/Sorority house	151	0.4
Other campus housing	637	1.7
Parent/Guardian's home	5082	13.5
Off-campus housing	2838	7.6
Other	869	2.3

Table 2 Continued

	Total Responses	Percentage

Did not respond	178	0.5
Impression of Overall Health		
Excellent	5518	14.7
Very Good	16473	43.9
Good	11708	31.2
Fair	2576	6.9
Poor	361	1.0
Don't Know	100	0.3
Did not respond	828	2.2
Age in Years		
18	22633	60.3
19	11144	29.7
20-29	2486	6.6
30 and above	1301	1.9
Did not respond	577	1.5
Enrollment Status		
Full-time	36100	96.6
Part-time	1088	2.9
Other	188	0.5
Did not respond	188	0.5
Last 12 Months: Transferred to College or University		
No	30449	81.1
Yes	6752	18.0
Did not respond	363	1.0
Institution Type		
Two-year	2684	7.1
Four-year or higher	34674	92.3
Other	206	0.5

Note. Totals may vary based on voluntary responses from survey completers.

For the purpose of this study, specific questions were used from the NCHA-II related to nutrition and exercise behaviors. Table 3 shows the responses regarding cardiovascular and strength training, as well as fruit and vegetable consumption. Information in this table is represented by compliance or non-compliance with national recommendations for daily or weekly physical activity or fruit and vegetable consumption.

Table 3

Nutritional and Physical Activity Behaviors

Type of Healthy Behavior	Total Responses	Percentage
Fruit and Vegetable Consumption		
Does not meet guidelines	15400	66.9
Meets guidelines	7623	33.1
Moderate Cardiovascular Exercise		
Does not meet guidelines	12302	53.7
Meets guidelines	10602	46.3
Vigorous Cardiovascular Exercise		
Does not meet guidelines	15479	67.7
Meets guidelines	7400	32.3
Strength Training		
Does not meet guidelines	17209	75.2
Meets guidelines	5661	24.8

Research Questions

The first research question addresses the extent to which a relationship exists between a college student's physical activity and his or her academic, personal-emotional, and social adjustment. This relationship was investigated using Spearman's rho correlation coefficient, using $p = 0.01$ as a significant level. A weak positive correlation at the 0.01 level was found for all adjustment types, as illustrated in Table 4. The highest level of correlation was found between strength training and personal-emotional adjustment with $p = 0.071$.

Table 4

Spearman Correlations Between Physical Activity and Adjustment Types

Physical Activity	Adjustment Type	Correlation Coefficient
Moderate Cardiovascular Exercise	Academic	0.030
Moderate Cardiovascular Exercise	Personal-Emotional	0.039
Moderate Cardiovascular Exercise	Social	0.027
Vigorous Cardiovascular Exercise	Academic	0.053
Vigorous Cardiovascular Exercise	Personal-Emotional	0.067
Vigorous Cardiovascular Exercise	Social	0.050
Strength Training	Academic	0.056
Strength Training	Personal Emotional	0.071
Strength Training	Social	0.013

The second research question addresses the extent to which a relationship exists between a college student's nutrition behavior (eating fruits and vegetables) and his or her academic, personal-emotional, and social adjustment. This relationship was investigated using Spearman's rho correlation coefficient. A weak positive correlation at the significant 0.01 level was found for academic and social adjustment, as illustrated in Table 5.

Table 5

Spearman Correlations Between Fruit and Vegetable Consumption and Adjustment Types

	Adjustment Type	Correlation Coefficient
Fruit and Vegetable Consumption	Academic	0.013
Fruit and Vegetable Consumption	Personal-Emotional	0.009
Fruit and Vegetable Consumption	Social	0.014

The third and fourth research questions examined the differences between college students who meet the minimum recommendations for physical activity, fruit and vegetable consumption, and adjustment types, and those students who do not. Specifically, these research questions examined if a student's adjustment level was different based on whether or not the student met the minimum recommendations for physical activity and healthy eating behaviors. Table 3 shows how many students either met or did not meet minimum national recommendations for both behaviors. A Multivariate Analysis of Variance (MANOVA) was used to compare group differences across the dependent variables of adjustment types, based on the independent variables of healthy behavior type.

Prior to conducting the MANOVA analysis, descriptive statistics were run to test the assumptions of the MANOVA and to investigate possible skewness. The results of this test revealed that strength training, academic adjustment, and social adjustment were all moderately to heavily skewed in a negative direction, thus the data are not normally distributed. The negatively skewed variables were reflected and the SQRT transformation resulted in a more normal distribution. The significance level used for the MANOVA was .016, after adjusting for the three dependent variables. Although the Box's Test of Equality of Covariance Matrices revealed a violation of equality across groups, the larger sample size allows for check for violation of assumptions using Pillai's Trace.

For the third research question, a MANOVA was run to determine if a difference exists between student adjustment levels and whether or not the student met the minimum recommended physical activity levels for moderate cardiovascular exercise, vigorous cardiovascular exercise, and strength training. There was a statistically significant difference

between students who did or did not meet the minimum moderate cardiovascular exercise recommendations, F (3, 22900) = 16.35, p = 0.00; Pillai's Trace = .002; partial eta squared = .873. An inspection of the mean scores showed that students who met the minimum recommended levels of moderate cardiovascular activity showed slightly higher levels of academic (M = 2.10, SD = .90), personal-emotional (M = 12.19, SD = 7.65), and social (M = 2.05, SD = .87) adjustment than those who did not (M = 2.16, SD = .91, M = 12.19, SD = 7.79, M = 2.11, SD = .88). There was a statistically significant difference between students who did or did not meet the minimum vigorous cardiovascular exercise recommendations, F (3, 22875) = 39.77, p = 0.00; Pillai's Trace = .005; partial eta squared = .858. An inspection of the mean scores showed that students who met the minimum recommended levels of vigorous cardiovascular activity showed slightly higher levels of academic (M = 2.06, SD = .89), personal-emotional (M = 11.76, SD = 7.49), and social (M = 2.01, SD = .86) adjustment than those who did not (M = 2.17, SD = .91, M = 12.92, SD = 7.82, M = 2.12, SD = .88). Finally, there was a statistically significant difference between students who did or did not meet the minimum strength training recommendations, F (3, 22866) = 39.77, p = 0.00; Pillai's Trace = .005; partial eta squared = .836. An inspection of the mean scores showed that students who met the minimum recommended levels of vigorous cardiovascular activity showed slightly higher levels of academic (M = 2.05, SD = .90), personal-emotional (M = 11.63, SD = 7.64), and social (M = 2.00, SD = .87) adjustment than those who did not (M = 2.16, SD = .91, M = 12.84, SD = 7.74, M = 2.11, SD = .88). The MANOVA results for physical activity and adjustment levels are found in Table 6.

Table 6

Multivariate Analysis of Variance for Physical Activity

Source	D*F*	*F*	η	*p*
Moderate Cardiovascular (M)	3	16.45	.873	.002
Vigorous Cardiovascular (V)	3	39.77	.858	.005
Strength Training (ST)	3	38.08	.836	.005
M x AA	1	23.40	.001	.000
M x PEA	1	42.15	.002	.000
M x SA	1	24.71	.001	.000
V x AA	1	72.16	.003	.000
V x PEA	1	113.17	.005	.000
V x SA	1	73.26	.003	.000
ST x AA	1	68.68	.003	.000
ST x PEA	1	104.81	.005	.000
ST x SA	1	72.59	.003	.000

Note. Academic Adjustment = AA; Personal-Emotional Adjustment = PEA; Social Adjustment = SA.

For the fourth research question, a MANOVA was run to determine if a difference exists between student adjustment levels and whether or not students met the minimum recommended daily fruit and vegetable consumption. There was a statistically significant difference between students who did or did not meet the minimum moderate cardiovascular exercise recommendations, $F(3, 23019) = 3.905$, $p = 0.08$; Pillai's Trace = .000; partial eta squared = .001. An inspection of the mean scores showed that students who met the minimum recommended levels of fruit and vegetable consumption showed slightly higher levels of academic ($M = 2.12$, $SD = .91$), personal-emotional ($M = 12.41$, $SD = 7.66$), and social ($M = 2.07$, $SD = .87$) adjustment than those who did not ($M = 2.14$, $SD = .91$, $M = 12.61$, $SD = 7.76$,

$M = 2.09$, $SD = .88$). The MANOVA results for fruit and vegetable consumption and adjustment levels are found in Table 7.

Table 7

Multivariate Analysis of Variance for Fruit and Vegetable Consumption

Source	D*F*	*F*	η	*p*
Fruit and Vegetable Consumption (FV)	3	3.905	.860	.008
FV x AA	1	3.27	.000	.070
FV x PEA	1	42.15	.000	.069
FV x SA	1	24.71	.000	.032

Note. Academic Adjustment = AA; Personal-Emotional Adjustment = PEA; Social Adjustment = SA.

Conclusion

This chapter presented an analysis of the data or the correlation and MANOVA findings. A higher number of males responded to the survey and a majority of the respondents were Caucasian. Most of the respondents were not in relationships and attended four-year institutions. A majority of the students lived in residence halls on campus and did not participate in varsity or any other type of organized athletic sport. One-third of students did not consume the recommended levels of fruits and vegetables, while the number of students who met the minimum physical activity guidelines varied. A little over half of the students met the minimum recommendations for moderate cardiovascular activity, and only one-third of students met the minimum recommendations for vigorous physical activity or strength training.

Research questions one and two investigated the possibility of a relationship between

physical activity and nutritious eating behavior and various type of student adjustment. Findings indicate that a significant positive correlation exists between college student's physical activity behavior and academic, personal-emotional, and social adjustment. Similarly, a significant positive correlation was found between college student's nutrition behavior and academic, personal-emotional, and social adjustment. This research suggests that more physical activity and nutritious eating is related to better academic, personal-emotional, and social adjustment.

Research questions three and four investigated the difference between students who met or did not meet the minimum recommendations for physical activity and nutritious eating behaviors. Students who met the recommendations for each type of physical activity all displayed higher levels of academic, personal-emotional, and social adjustment compared to those who did not. In addition, students who met the recommendations for fruit and vegetable consumption displayed higher levels of academic, personal-emotional, and social adjustment compared to those who did not. This research suggests that students who are better adjusted academic, personal-emotionally, and socially are more likely to meet the recommended physical activity and nutrition guidelines. However, it is important to recognize that this study does not imply a cause-effect relationship between the healthy behavior and adjustment levels.

CHAPTER V: DISCUSSION AND CONCLUSION

Chapter I provided background information for this study, including a statement of problem, significance and purpose, definition of terms, research questions, methodology, limitations, and assumptions. Chapter II presented literature relevant to college student health behaviors and adjustment theory. Chapter III described the design of the study, including methodology and data collection and analyses procedures. Chapter IV detailed the results of the data analyses. This chapter provides a summary and interpretation of the findings, implications for national health and college student adjustment, presents limitations of the study, and suggests directions for future research.

Summary of the Study

This study explored possible relationships between study adjustment theory and college student health behaviors. It also explored the differences between students who engaged in the recommended national levels of physical activity and nutritional intake for fruits and vegetables. The focus of the study centered on first-year freshmen students due to the use of student adjustment theory, which investigates transitioning of first-year students to college. No age restrictions were used to define freshmen-level students.

The study sought to answer the following research questions:

Question 1: To what degree does a relationship exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Question 2: To what degree does a relationship exist between a college student's nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?

Question 3: Is there a significant difference between college students who meet the minimum recommended levels of physical activity behavior and (a) academic, (b) personal-

emotional, and (c) social adjustment and those who do not?

Question 4: Is there a significant difference between college students who meet the minimum recommended amounts of fruit and vegetable intake exhibit higher levels of (a) academic, (b) personal-emotional, and (c) social adjustment than those who do not?

The data used to investigate the research questions were gathered by the National College Health Assessment II survey between academic years 2008 and 2009. The American College Health Association distributes this survey to all higher education institutions on a bi-annual basis. Due to the change in the survey structure in 2008, prior years' data was not used for the purpose of this study. Spearman's rho correlation coefficient was used to investigate relationships in the first two research questions and MANOVA was used to compare group differences for the third and fourth research questions. Results were considered significant at the $p = 0.01$ level, due to the large sample size.

Major Findings

The findings of this study begin to reveal the impact of physical activity and nutritious eating on college student adjustment, specifically in the areas of academic, personal-emotional, and social adjustment. Although limited in scope, the results of this study suggest encouraging effects of these health behaviors. Students who are better adjusted academically, personally, emotionally, and socially are more likely to meet the recommended physical activity and nutritious eating guidelines.

While a cause-effect relationship between healthy behaviors and adjustment cannot be determined from the findings of this study, in general, a positive correlation exists between a college student's physical activity and his or her academic, personal-emotional, and social adjustment. Although the level of correlation was weak in some cases, each type of physical

activity (moderate cardiovascular, vigorous cardiovascular, and strength training) all were significantly correlated to each adjustment type. Similarly, a positive correlation exists between a student's fruit and vegetable consumption and his or her academic and social adjustment. Personal-emotional adjustment was not found to be significantly correlated with nutritious eating. These results support the hypotheses that a correlation exists between these specific health behaviors and academic, personal-emotional, and social adjustment.

Further analyses revealed that differences exist between students who meet the minimum recommendations for physical activity, fruit and vegetable consumption, and level of adjustment compared to those who did not meet the recommendations. A statistically significant difference was found between these groups, suggesting that students with higher levels of adjustment tend to also engage in the recommended levels of physical activity or nutritious eating. These results support the hypotheses that students who engage in the minimum recommended levels of physical activity and nutritious eating also report higher levels of adjustment to college.

Implications

National Health Implications

Nationally, the United States is experiencing an obesity health crisis. Over the past 20 years, adult obesity has increased by 50% (U.S. Department of Health and Human Services, 2000). In addition, children and adolescent obesity have almost doubled and tripled since the mid-1980's (U.S. Department of Health and Human Services, 2001). The U.S. Department of Health and Human Services (DHHS) found that approximately 300,000 deaths a year in this country are associated with obesity or overweight health conditions. Most American adults do not participate in the recommended amount of regular physical activity, with 25% not participating in any form of exercise (U.S. Department of Health and Human Services, Centers

for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, & The President's Council on Physical Fitness and Sports, 1999; U.S Department of Health and Human Services, 2000). Less than 10% of adults aged 19-30 years meet or exceed the combined recommendation of fruits and vegetables based on the Food Guide Pyramid (Produce for Better Health Foundation, 2005). If students can establish healthy behaviors while in college, that may result in a lower rate of obesity and other related health challenges.

Implications for College Student Health and Adjustment

Adolescent exercise and eating behaviors are studied as a result of increased interest in the creation of healthy habits early in life and the possible connections to academic performance. *Healthy People 2010* recommended physical activity as one of the leading health indicators for adolescents. In 1999, 65% of adolescents engaged in the recommended amount of physical activity, leading to a target recommendation of 85% in 2010 (U.S. Department of Health and Human Services, 2000). Several studies link participation in physical activity in adolescence to higher levels of physical activity in adulthood (Hills, King, & Armstrong, 2007; Tammelin, Näyhä, Laitinen, Rintamäki, & Jävelin, 2003; Telama, Yang, Viikari, Välimäki, Wanne, & Raitakari, 2005).

Overall, exercise levels for adolescents remain unchanged since 1993, with 65% of high school students reporting that they exercise three or more times per week. Moving into the traditional college-age of 18-24 years, 60% of students reported exercising at the same frequency, suggesting only a small decline in exercise behaviors (Mulye, Park, Nelson, Adams, Irwin, & Brindis, 2009). Gordon-Larsen, Nelson, and Popkin (2004) cited the opposite in their research, stating that adolescents who engaged in physical activity five or more times a week

were not likely to continue the behavior into adulthood; only 4.4% reported continued physical activity participation.

In addition to physical health, research shows that physical activity affects mental and cognitive functioning Physical activity has a positive effect on academic performance in children and adolescents (Action for Healthy Kids, 2004; Carlson, Fulton, Lee, Maynard, Brown, Kohl, & Dietz, 2008; Castelli, Hilman, Buck, & Erwin, 2007; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Grissom, 2005; Sallis, McKenzie, Kolody, Lewis, Marshall, & Rosengard, 1999; Shephard, 1997). In high school-aged students, physical activity is connected to higher levels of self-esteem and lower levels of anxiety and stress, both of which are associated with improved academic performance (Action for Healthy Kids, 2004). Finally, high school students report higher levels of school contentment with higher levels of physical activity, which moderately relate to academic achievement (Kristjánsson, Sigfúsdóttir, Allegrante, & Helgason, 2009).

Similar to physical activity, young children and adolescent-aged nutrition behaviors lack in comparison to national recommendations- they are not eating near the amount of fruits and vegetables recommended on a daily basis (Neumark-Sztainer, Story, Toporoff, Himes, Resnick, & Blum, 1997; Sanchez, Norman, Sallis, Calfas, Cella, & Patrick, 2007; Speck, Bradley, Harrell, & Belyea, 2001). High school-aged students exhibit the same fruit and vegetable consumption behaviors (Larson, Neumark-Sztainer, Hannan, & Story, 2007; Mulye, et al., 2009; Pearson, et al., 2009). Lower socioeconomic status and gender may affect dietary behaviors. Neumark-Sztainer, Story, Resnick, and Blum (1996) suggested that students from lower socioeconomic status cannot afford or do not have the same level of nutrition education as students from families with higher socioeconomic status. Gender may also explain some differences in healthy

eating behaviors, as female students may increase fruit and vegetable consumption in an effort to control weight in high school (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008; Pesa and Turner, 2001; Sabistin & Crocker, 2008). Striegel-Moore, Thompson, Affenito, Franko, Barton, Schreiber, Daniels, Schmidt, and Crawford (2006) discovered possible differences due to race, as illustrated in their finding that Caucasian girls consume fruits and vegetables more frequently than African-American girls.

Similar to exercise, healthy eating behaviors are linked to improved academic performance in children and adolescents (Benton & Jarvis, 2007; Fu, Cheng, Tu, & Pan, 2007). Students who eat breakfast tend to perform better on memory recall tests (Rampersaud, Pereira, Girard, Adams, & Metzl, 2005). Overall, well-nourished students tend to be better students and perform better on standardized tests. If students do not receive adequate consumption of nutrients from key food groups such as fruits and vegetables, they are deprived of nutrients necessary for optimal cognitive function (Action for Healthy Kids, 2004).

Implications for Higher Education Professionals

Findings in this study suggest that physical activity and nutritious eating may be related to positive adjustment to college. College administrators can use this knowledge to identify opportunities for improving student physical activity levels and nutritious eating behaviors. However, institutions may be challenged by these tasks. Many institutions do not require physical activity coursework in degree curricula and students may be unwilling to register for coursework not needed for graduation. As a result, the majority of students in college participate in physical activity by choice. In addition, as mentioned before, if the student did not participate in physical activity prior to attending college, the likelihood that he or she will start a new routine in the freshman year is low. Students' food choices depend upon a variety of factors,

including place of residence, amount of time spent on campus, food preferences, and ability to pay for food on campus.

Freshmen have varying backgrounds, knowledge levels of healthy behaviors, habits, and desire to lead healthy lifestyles. Interventions and programs aimed at increasing healthy behaviors may not reach non-residential students. College administrators can provide opportunities for students to engage in healthy behaviors outside of the classroom, using learning communities or living-learning communities as ways to introduce physical activity and exercise into students' routines. Residence hall staff can use the results of this study to advocate for healthier cafeteria selections and more activities to promote physical activity in their students.

Limitations and Directions for Future Research

Several limitations exist in this study and have been mentioned in previous chapters. This is primarily due to the investigative nature of this study and its resulting design. The study examined only two variables, physical activity and nutritious eating, and the possible relationship to adjustment. Other variables could impact a student's academic, personal-emotional, and social adjustment. As a result, results in this study may not be entirely due to physical activity and nutrition alone. Further experimental research is needed to isolate the physical activity and nutrition variables to better investigate their impact on adjustment.

Although a national survey was used as a way to ensure a large sample size, it is important to note that inherent limitations that result from a nominal-based instrument. The instrument used in this study, the NCHA-II, is not meant to be a predictive measurement tool. Creating a scale based on nominal data may not be a true reflection of adjustment, therefore, the assumptions made as a result of this study may be flawed. Survey data included the 2008 and 2009 academic years only, due to a change in the survey after 2007. By excluding prior years of

data, the scope of the findings is diminished. In addition, the sample of the students included in this study is a small amount compared to the overall population of freshmen attending higher education institutions in this country. It is still unknown if the results of this study are representative of the national population of freshmen attending college. Another study of this type should utilize an assessment instrument that was created for its predictive capabilities.

Baker and Siryk's model of college student adjustment was used as a theoretical framework for this study. The questions on the NCHA-II were not designed to measure adjustment. The researcher's own judgment was used to determine if questions on the NCHA-II should be included or excluded, based on Baker and Siryk's operational definitions of adjustment. In the future, it may be advantageous to combine Baker and Siryk's adjustment assessment inventory and another health behavior questionnaire.

Conclusion

The results of this study could help improve the understanding of how physical activity and nutrition potentially impact freshmen college student adjustment. Adjustment to a new college or university impacts student success (Aspinwall & Taylor, 1992; Gerdes & Mallinckrodt, 1994). Furthermore, adjustment to college can have a large effect on retention and graduation rates, a common interest shared by many colleges and universities today.

While much of the literature focuses on other areas of college student health, little research was found relating physical activity and nutrition to adjustment. The findings illustrate the need to investigate this area of college student development further. Using Baker and Siryk's adjustment theory enhances the quality of this study and presents a structure for further research. Finally, implications for practice and impact on higher education and national public health were indentified that will serve both the educational and health community alike.

References

Action for Healthy Kids. (2004). *The learning connection: The value of improving nutrition and physical activity in our schools.* Retrieved from Action for Healthy Kids website: http://www.actionforhealthykids.org/resources.files/learning-connection.pdf

Adams, T., & Colner, W. (2008). The association of multiple risk factors with fruit and vegetable intake among a nationwide sample of college students. *Journal of American College Health, 56*(4), 455-461.

American College Health Association. *Healthy Campus 2010 Manual.* Baltimore, MD: February 2006.

American College Health Association. (2009). American College Health Association-National College Health Assessment Spring 2008 Reference Group Data Report (Abridged). *Journal of American College Health, 57*(5), 477-488.

Anding, J., Suminski, R., & Boss, L. (2001). Dietary intake, body mass index, exercise and alcohol: are college women following the dietary guidelines for Americans?. *Journal of American College Health, 49*(4), 167-71.

Aruguete, M.S., DeBord, K.A., Yates, A., & Edman, J. (2005). Ethnic and gender differences in eating attitudes among black and white college students. *Eating Behaviors, 6*(4), 328-336.

Aspinwall, L.G., & Taylor, S.E. (1992). Modeling cognitive adaptation: A longitudinal investigation of the impact of individual differences and coping on college adjustment and performance. *Journal of Personality and Social Pyschology, 63*(6), 989-1003.

Baker, R.W., McNeil, O.V., & Siryk, B. (1985). Expectation and reality in freshman

adjustment to college. *Journal of Counseling Psychology, 32*(1), 94-103.

Baker, R.W., & Siryk, B. (1984). Measuring adjustment to college. *Journal of Counseling Psychology, 31*(2), 179-189.

Baker, R.W., & Siryk, B. (1986). Exploratory intervention with a scale measuring adjustment to college. *Journal of Counseling Psychology, 33*(1), 31-38.

Behrens, T.K., Dinger, M.K., Heesch, K.C., & Sisson, S.B. (2005). College students' understanding of moderate physical activity: A qualitative study. *American Journal of Health Studies, 20*(3), 129-134.

Benton, D., & Jarvis, M. (2007). The role of breakfast and a mid-morning snack on the ability of children to concentrate at school. *Physiology and Behavior, 90*, 382-385.

Benton, D., Slater, O., & Donohoe, R.T. (2001). The influence of breakfast and a snack on psychological functioning. *Physiology and Behavior, 74*(4), 559-571.

Blair, S.N., Jacobs, D.R., & Powell, K.E. (1985). Relationships between exercise or physical activity and other health behaviors. *Public Health Reports, 100*(2), 172-180.

Boyle, J.R., & LaRose, N.R. (2008). Personal beliefs, the environment and college students' exercise and eating behaviors. *American Journal of Health Studies, 23*(4), 195-200.

Bray, S., & Born, H. (2004). transition to university and vigorous physical activity: Implications for health and psychological well-being. *Journal of American College Health, 52*(4), 181-8.

Bray, S., & Kwan, M. (2006). Physical activity is associated with better health and psychological well-being during transition to university life. *Journal of American College Health, 55*(2), 77-82.

Brener, N.D., Billy, J.O.G., & Grady, W.R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*(6), 436-457.

Brevard, P.B, & Ricketts, C.D. (1996). Residence of college students affects dietary intake, physical activity, and serum lipid levels. *Journal of the American Dietetic Association, 96*(1), 35-38.

Brindis, C., & Reyes, P. (1997). At the crossroads: Options for financing college health. *Journal of American College Health, 45*(6), 279-288. Retrieved from Academic Search Complete database.

Brisswalter, J., Collardeau, M., & René, A. (2002). Effects of acute physical exercise characteristics on cognitive performance. *Sports Medicine, 32*(9), 555-566.

Brown, L.B., Dresen, R.K., & Eggett, D.L. (2005). College students can benefit by participating in a prepaid meal plan. *Journal of the American Dietetic Association, 105*(3), 445-448.

Brunt, A.R., & Rhee, Y.S. (2008). Obesity and lifestyle in U.S. college students related to living arrangements. *Appetite, 51*(3), 615-621.

Buckworth, J., & Nigg, C. (2004). Physical activity, exercise, and sedentary behavior in college students. *Journal of American College Health, 53*(1), 28-34.

Butler, S.M., Black, D.R., Blue, C.L., & Gretebeck, R.J. (2004). Change in diet, physical activity, and body weight change in female college freshman. *American Journal of Health Behavior, 28*(1), 24-32.

Carlson, S.A., Fulton, J.E., Lee, S.M., Maynard, M., Brown, D.R., Kohl, III.,H.W., &

Dietz, W.H. (2008). Physical education and academic achievement in elementary school: Data from the early childhood longitudinal study. *American Journal of Public Health, 98*(4), 721-727.

Castelli, D.M., Hillman, C.H., Buck, S.M., & Erwin, H.E. (2007). Physical fitness and academic achievement in third and fifth-grade students. *Journal of Sports and Exercise Physiology, 29*(2), 239-252.

Chung, S., & Hoerr, S.L. (2005). Predictors of fruit and vegetable intakes in young adults by gender. *Nutrition Research, 25*(5), 453-463.

Chung, S.J., Hoerr, S., Levine, R., & Coleman, G. (2006). Processes underlying young women's decisions to eat fruits and vegetables. *Journal of Human Nutrition and Dietetics, 19*(4), 287-298.

Coe, D.P., Pivarnik, J.M., Womack, C.J., Reeves, M.J., & Malina, R.M. (2006). Effect of physical education and activity levels on academic achievement in children. *Medicine and Science in Sports and Exercise, 38*(8), 1515-1519.

Cullen, K.W., Koehly, L.M., Anderson, C., Baranowski, T., Prokhorov, A., Basen-Engquist, K., Wetter, D., & Hergenroeder, A. (1999). Gender differences in chronic disease risk behaviors through the transition out of high school. *American Journal of Preventative Medicine, 17*(1), 1-7.

Dansky, K., Colbert, C., & Irwin, P. (1996). Developing and using a patient satisfaction survey: A case study. *Journal of American College Health, 45*(2), 83-88. Retrieved from CINAHL Plus with Full Text database.

de Bruijn, G.-J. (2010). Understanding college students' fruit consumption: Integrating habit strength in the theory of planned behavior. *Appetite, 54*(1), 16-22.

Dinger, M.K. (1999). Physical activity and dietary intake among college students. *American Journal of Health Studies, 15*(3), 139-148.

Driskell, J.A., Meckna, B.R., Scales, N.E. (2006). Differences exist in the eating habits of university men and women at fast food restaurants. *Nutrition Research, 26*(10), 524-530.

Driskell, J.A., Schake, M.C., & Detter, H.A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *Journal of the American Dietetic Association, 108*(12), 2071-2076.

Driskell, J.A., Young-Nam, K., & Goebel, K.J. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American Dietetic Association, 105*(5), 798-801.

Economos, C.E., Hildebrandt, M.L., & Hyatt, R.R. (2008). College freshman stress and weight change: Differences by gender. *American Journal of Health Behavior, 32*(1), 16-25.

Edmonds, M.J., Ferreira, K.J., Nikiforuk, E.A., Finnie, A.K., Leavey, S.H., Duncan, A.M., Simpson, J.A.R. (2008). Body weight and percent fat increase during the transition from high school to university in females. *Journal of the American Dietetic Association, 108*(6), 1033-1037.

Ehrenberg, R.G. (2006). *What's Happening to Public Higher Education?* Portsmouth, NH: Greenwood Press.

Elliott, T.R., Johnson, M.O., & Jackson, R. (1997). Social problem solving and health behaviors of undergraduate students. *Journal of College Student Development, 38*(1), 24-55.

Ewell, P.T., & Boyer, C.M. (1988). Acting out state-mandated assessment: Evidence from

five states. *Change, 20*(4), 40-47. Retrieved from http://www.jstor.org/pss/40177654.

Fischer, K., Colombani, P.C., Langhans, W., & Wenk, C. (2002). Carbohydrate to protein ratio in food and cognitive performance in the morning. *Physiology and Behavior, 75*(30), 411-423.

Friedlander, L.J., Reid, G.J., Shupak, N., & Cribbie, R. (2007). Social support, self-/ esteem, and stress as predictors of adjustment to university among first-year undergraduates. *Journal of College Student Development, 48*(3), 259-274.

Fu, M., Cheng, L., Tu, S., & Pan, W. (2007). Association between unhealthful eating patterns and unfavorable overall school performance in children. *Journal of the American Dietetic Association, 107*(11), 1935-1943.

George, D., Dixon, S., Stansal, E., Gelb, S., & Pheri, T. (2008). Time diary and questionnaire assessment of factors associated with academic and personal success among university undergraduates. *Journal of American College Health, 56*(6), 706-715.

Gerdes, H., & Mallinckrodt, B. (1994). Emotional, social, and academic adjustment of college students: A longitudinal study of retention. *Journal of Counseling and Development, 72*(3), 281-288.

Gerend, M.A. (2009). Does calorie information promote lower calorie fast food choices among college students? *Journal of Adolescent Health, 44*(1), 84-86.

Gordon-Larsen, P., Nelson, M.C., & Popkin, B.M. (2004). Longitudinal physical activity and sedentary behavior trends: Adolescence to adulthood. *American Journal of Preventative Medicine, 27*(4), 277-283.

Grace, T.W. (1997). Health problems of college students. *Journal of American College Health, 45*(6), 243-250. Retrieved from Academic Search Premier database.

Grissom, J. B. (2005). Physical fitness and academic achievement. *Journal of Exercise Physiologyonline, 8*(1), 11–25. Retrieved from http://www.asep.org/files/Grissom.pdf

Grubbs, L., & Carter, J. (2002). The relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates. *Family and Community Health, 25*(2), 76-84.

Gyurcsik, N.C., Bray, S.R., & Brittain, D.R. (2004). Coping with barriers to vigorous physical activity during transition to university. *Family and Community Health, 27*(2), 130-142.

Guskin, A. (1997). Learning more, spending less. *About Campus, 2*(3), 4-9.

Haberman, S., & Luffey, D. (1998). Weighing in college students' diet and exercise behaviors. *Journal of American College Health, 46*(4), 189-91.

Hailey, B., Pargeon, K., & Crawford, V. (2000). Can healthcare providers at a university health clinic predict patient satisfaction?. *Journal of American College Health, 49*(3), 111-117. Retrieved from CINAHL Plus with Full Text database.

Ham, L.S., & Hope, D.A. (2003). College students and problematic drinking: A review of the literature. *Clinical Psychology Review, 23*(5), 719-759.

Hendricks, K.M., Herbold, N., & Fung, T. (2004). Diet and other lifestyle behaviors in young college women. *Nutrition Research, 24*(2), 981-991.

Hermon, D.A, & Davis, G.A. (2004). College student wellness: A comparison between traditional and nontraditional-age students. *Journal of College Counseling, 7*(1), 32-39.

Hills, A.P., King, N.A., & Armstrong, T.P. (2007). The contributions of physical activity and sedentary behaviors to the growth and development of children and adolescents: Implications for overweight and obesity. *Sports Medicine, 37*(6), 533-545.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health, 26*(1), 259-279.

Hiza, H., & Gerrior, S.A. (2002). Using the Interactive Healthy Eating Index to assess the quality of college students' diets. *Family Economics and Nutrition Review, 14*(1), 3-12.

Hoerr, S.L., Bokram, R., Lugo, B., Bivins, T., & Keast, D.R. (2002). Risk for disordered eating relates to both gender and ethnicity for college students. *Journal of the American College of Nutrition, 21*(4), 307-314.

Holmbeck, G.N., & Wandrei, M.L. (1993). Individual and relational predictors of adjustment in first-year college students. *Journal of Counseling Psychology, 40*(1), 73-78.

Horneffer-Ginter, K. (2008). Stages of change and possible selves: 2 tools for promoting college health. *Journal of American College Health, 56*(4), 351-358.

Huang, T., Harris, K., & Lee, R. (2003). Assessing overweight, obesity, diet, and physical activity in college students. *Journal of American College Health, 52*(2), 83-6.

Hudd, S., Dumlao, J., Erdmann-Sager, D., Murray, D., Phan, E., Soukas, N., & Yokozuka, N. (2000). Stress at college: Effects on health habits, health status and self-esteem. *College Student Journal, 34*(2), 217-227.

Jackson, R., Berry, T., & Kennedy, M. (2009). The relationship between lifestyle and campus eating behaviors in male and female university students. *College Student Journal, 43*(3), 860-871.

Johnson, A., O'Brien, J., & Dahlke, L. (2006). The effect of an acute exercise bout on

academic performance of kinesiology undergraduate students. *Journal of Undergraduate Kinesiology Research, 1*(2), 23-30.

Johnson, M.F., Nichols, J.F., Sallis, J.F., Calfas, K.J., & Hovell, M.F. (1998). Interrelationships between physical activity and other health behaviors among university men and women. *Preventative Medicine, 27*(4), 536-544.

Jorm, A.F., Anstey, K.A., Christensen, H., & Rogers, B. (2004). Gender differences in cognitive abilities: The mediating role of health state and health habits. *Intelligence, 32*(1), 7-23.

Jung, M., Bray, S., & Ginis, K. (2008). Behavior change and the freshman 15: Tracking physical activity and dietary patterns in 1st-year university women. *Journal of American College Health, 56*(5), 523-530.

Kanarek, R.B., & Swinney, D. (1990). Effects of food snacks on cognitive performance in male college students. *Appetite, 14*(11), 15-27.

Kashihara, K., Maruyama, T., Murota, M., & Nakahara, Y. (2009). Positive effects of acute and moderate physical exercise on cognitive function. *Journal of Physiological Anthropology, 28*(4), 155-164.

Keating, X., Guan, J., Pinero, J., & Bridges, D.M. (2005). A meta-analysis of college students' physical activity behaviors. *Journal of American College Health, 54*(2), 116-25.

Kerr, S., Johnson, V.K., Gans, S.E., & Krumrine, J. (2004). Predicting adjustment during the transition to college: Alexithymia, perceived stress, and psychological symptoms. *Journal of College Student Development, 45*(6), 593-611.

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for

physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*(2), 87-94.

Kitzrow, M.A. (2003). The mental health needs of today's college students: Challenges and recommendations. *NASPA Journal, 41*(1), 165-179.

Kristjánsson, Á.L., Sigfúsdóttir, I.D., Allegrante, J.P., & Helgason, Á.R. (2009). Adolescent health behavior, contentment in school and academic achievement. *American Journal of Health Behavior, 33*(1), 69-79.

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

Lake, A.A., Townshend, T., Alvanides, S., Stamps, E., & Adamson, A.J. (2009). Diet, physical activity, sedentary behavior and perceptions of the environment in young adults. *Journal of Human Nutrition and Dietetics, 22*(5), 444-454.

Largo-Wight, E., Peterson, P.M., & Chen, W.W. (2005). Perceived problem solving, stress and health among college students. *American Journal of Health Behavior, 29*(4), 260-270.

Larson, N.I., Neumark-Sztainer, D., Hannan, P.J., & Story, M. (2007). Trends in adolescent fruit and vegetable consumption, 1999-2004: Project EAT. *American Journal of Preventative Medicine, 32*(2), 147-150.

Lindsey, B. (1997). Peer education: A viewpoint and critique. *Journal of American College Health, 45*(4), 187-189. Retrieved from CINAHL Plus with Full Text database.

Lloyd-Richardson, E.E., Bailey, S., Fava, J.L., Wing, R., & the Tobacco Etiology Research Network. (2009). A prospective study of weight gain during the college freshman and sophomore years. *Preventative Medicine, 48*(3), 256-261.

Lowry, R., Galduska, D.A., Fulton, J.E., Wechsler, H., Kann, L., & Collins, J.L. (2000). Physical activity, food choice, and weight management goals and practices among U.S. college students. *American Journal of Preventative Medicine, 18*(1), 18-27.

Lowery, S.E., Robinson-Kurpius, S.E., Befort, C., Blanks, E.H., Sollenburger, S., Nicpon, M.F., & Huser, L. (2005). Body image, self-esteem, and health-related behaviors among male and female first year college students. *Journal of College Student Development, 46*(6), 612-623.

McArthur, L., Grady, F.M., Rosenberg, R.I., & Howard, A.B. (2000). Knowledge of college students regarding three themes related to dietary recommendations. *American Journal of Health Studies, 16*(4), 177-184.

McArthur,L.H., & Raedeke, T.D. (2009). Race and sex differences in student physical activity correlates. *American Journal of Health Behavior, 33*(1), 80-90.

Martin, W.E., Swartz-Kulstad, J.L., & Madson, M. (1999). Psychosocial factors that predict the college adjustment of first-year undergraduate students: Implications for college counselors. *Journal of College Counseling, 2*(2), 121-133.

Mills, D., & Gold, R. (1996). Healthcare reform: A survey of college health services. *Journal of American College Health, 45*(3), 106-118. Retrieved from Academic Search Complete database.

Morse, K.L., & Driskell, J.A. (2009). Observed sex differences in fast-food consumption and nutrition assessments and beliefs of college students. *Nutrition Research, 29*(3), 173-179.

Mulye, T.P., Park, J.M., Nelson, C.D., Adams, S.H., Irwin, C.E., & Brindis, C.D. (2009).

Trends in adolescent and young adult health in the United States. *Journal of Adolescent Health, 45*(1), 8-24.

Nelson, M.C., & Story, M. (2009). Food environments and university dorms: 20,000 calories per dorm room and counting. *American Journal of Preventative Medicine, 36*(6), 523-526.

Nelson, M.C., Story, M., Larson, N.I., Neumark-Sztainer, D., & Lytle, L.A. (2008). Emerging adulthood and college-aged youth: An overlooked age for weight-behavior change. *Obesity, 16*(10), 2205-2211.

Neumark-Sztainer, D., Story, M., Resnick, M.D., & Blum, R.W. (1996). Correlates of inadequate fruit and vegetable consumption among adolescents. *Preventative Medicine, 25*(5), 497-505.

Neumark-Sztainer, D., Story, M., Toporoff, E., Himes, J.H., Resnick, M.D., & Blum, R.W. (1997). Covariations of eating behaviors with other health-related behaviors among adolescents. *Journal of Adolescent Health, 20*(6), 450-458.

Pascarella, E.T. (2006). How college affects students: Ten directions for future research. *Journal of College Student Development, 47*(5), 508-520.

Patrick, K., Grace, T.W., & Lovato, C.Y. (1992). Health issues for college students. *Annual Review of Public Health, 13*, 253-268.

Peñas-Lledó, E., Sancho, L, & Waller, G. (2002). Eating attitudes and the use of alcohol, tobacco, and exercise among male and female adolescents. *Eating Behaviors, 3*(2), 101-111.

Pesa, J., & Turner, L. (2001). Fruit and vegetable intake and weight-control behaviors among U.S. youth. *American Journal of Health Behavior, 25*(1), 3-9.

Pearman, S., Valois, R., Sargent, R., Saunders, R., Drane, J., & Macera, C. (1997). The impact of a required college health and physical education course on the health status of alumni. *Journal of American College Health, 46*(2), 77-85. Retrieved from CINAHL Plus with Full Text database.

Peters, P.K., Amos, R.J., Hoerr, S.L., Koszewski, W., Huang, Y., & Betts, N. (1996). Questionable dieting behaviors are used by young adults regardless of sex or student status. *Journal of the American Dietetic Association, 96*(7), 709-711.

Pinto, B., Cherico, N., & Szymanski, L. (1998). Longitudinal changes in college students' exercise participation. *Journal of American College Health, 47*(1), 23-7.

Plesko, M., Cotunga, N., & Aljadir, L. (2000). Usefulness of a brief fruit and vegetable FFQ in a college population. *American Journal of Health Behavior, 24*(3), 201-208.

Pritchard, M.E., & Wilson, G.S. (2003). Using emotional and social factors to predict student success. *Journal of College Student Development, 44*(1), 18-28.

Produce for Better Health Foundation. (2005). *State of the Plate 2005: Student on America's Consumption of Fruits and Vegetables.* Retrieved from the Produce for Better Health Foundation website: http://www.pbhfoundation.org/pulse/research/pbhrsearch/stateoftheplate

Pronk, N.P., Anderson, L.H., Crain, A.L., Martinson, B.C., O'Connor, P.J., Sherwood, N.E., & Whitebird, R.R. (2004). Meeting recommendations for multiple healthy lifestyles. *American Journal of Preventative Medicine, 27*(2S), 25-33.

Racette, S., Deusinger, S., & Strube, M. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health, 53*(6), 245-51.

Racette, S.B., Duesinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.H. (2008). Changes in weight and health behaviors from freshman through senior year of college. *Journal of Nutrition Education and Behavior, 40*(1), 39-42.

Rampersaud, G.C., Pereira, M.A., Girard, B.L., Adams, J., & Metzl, J.D. (2005). Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association, 105*(5), 743-760.

Richards, A., Kattelmann, K.K., & Ren, C. (2006). Motivating 18- to 24-year-olds to increase their fruit and vegetable consumption. *Journal of the American Dietetic Association, 106*(9), 1405-1411.

Rogers, L.S., & Tennison, L.R. (2009). A preliminary assessment of adjustment disorder among first-year college students. *Archives of Psychiatric Nursing, 23*(3), 220-230.

Rosenberg, D.E., Norman, G.J., Sallis, J.F., Calfas, K.J., & Patrick, K. (2007). Covariation of adolescent physical activity and dietary behaviors over 12 months. *Journal of Adolescent Health, 41*(5), 472-478.

Ross, S.R., Niebling, B.C., & Heckert, T.M. (1999). Sources of stress among college students. *College Student Journal, 33*(2), 312-317.

Sabiston, C.M., & Crocker, P.R.E. (2008). Examining an integrating model of physical activity and healthy eating self-perceptions and behaviors among adolescents. *Journal of Adolescent Health, 42*(1), 64-72.

Sallis, J.F., McKenzie, T.L., Kolody, B., Lewis, M., Marshall, S., & Rosengard, P. (1999). Effects of health-related physical education on academic achievement: Project SPARK. *Research Quarterly for Exercise and Sport, 70*(2), 127-134.

Sanchez, A., Norman, G.J., Sallis, J.F., Calfas, K.J., Cella, J., & Patrick, K. (2007).

Patterns and correlates of physical activity and nutrition behaviors in adolescents. *American Journal of Preventative Medicine, 32*(2), 124-130.

Schenkel, T.C., Stockman, N.K.A., Brown, J.N., & Duncan, A.M. (2007). Evaluation of energy, nutrient and dietary fiber intakes of adolescent males. *Journal of the American College of Nutrition, 26*(3), 264-271.

Schwitzer, A.M., & Metzinger, T. (1998). Applying the *Student Learning Imperative* to counseling center outcome evaluation. *Journal of College Student Psychotherapy, 13*(2), 71-92.

Seo, D., Nehl, E., Agley, J., & Ma, S. (2007). Relations between physical activity and behavioral and perceptual correlates among Midwestern college students. *Journal of American College Health, 56*(2), 187-197.

Serdula, M.K., Gillespie, C., Kettle-Khan, L., Farris, R., Seymour, J., & Denny, C. (2004). Trends in fruit and vegetable consumption among adults in the United States: Behavioral Risk Factor Surveillance System, 1994-2000. *American Journal of Public Health, 94*(6), 1014-1018.

Shaikh, A.R., Yaroch, A.L., Nebeling, L., Yeh, M., Resnicow, K. (2008). Psychosocial predictors of fruit and vegetable consumption in adults: A review of the literature. *American Journal of Preventative Medicine, 34*(6), 535-543.

Shephard, R.J. (1997). Curricular physical activity and academic performance. *Pediatric Exercise Science, 9*(2), 113-126.

Shive, S., & Morris, M. (2006). Evaluation of the "Energize Your Life!" social marketing campaign pilot study to increase fruit intake among community college students. *Journal of American College Health, 55*(1), 33-9.

Soet, J., & Sevig, T. (2006). Mental health issues facing a diverse sample of college students: Results from the College Student Mental Health Survey. *NASPA Journal, 43*(3), 410-431.

Song, W.O., Schuette, L.K., Huang, Y., & Hoerr, S. (1996). Food group intake patterns in relation to nutritional adequacy of young adults. *Nutrition Research, 16*(9), 1507-1519.

Soriano, J.M., Moltó, J.C., Mañes, J. (2000). Dietary intake and food pattern among university students. *Nutrition Research, 20*(9), 1249-1258.

Speck, B.J., Bradley, C.B., Harrell, J.S., & Belyea, M.J. (2001). A food frequency questionnaire for youth: Psychometric analysis and summary of eating habits in adolescents. *Journal of Adolescent Health, 28*(1), 16-25

Stephenson, M.T. (1999). Using formative research to conceptualize and develop a marketing plan for student health services. *Journal of American College Health, 47*(5), 237-239.

Striegel-Moore, R.H., Thompson, D.R., Affenito, S.G., Franko, D.L., Barton, B.A., Schreiber, G.B., Daniels, S.R., Schmidt, M., & Crawford, P.B. (2006). Fruit and vegetable intake: Few adolescent girls meet national guidelines. *Preventative Medicine, 42*(3), 223-228.

Steenbarger, B.N., & Manchester, R.A. 1996). Designing the study. *Journal of American College Health, 44*(5), 201-205. Retrieved from the Psychology and Behavioral Sciences Collection database.

Suminski, R., Petosa, R., & Utter, A. (2002). Physical activity among ethnically diverse college students. *Journal of American College Health, 51*(2), 75-80.

Taeho, Y., Heewon, Y., & Gordon, B. (2008). Status of participation in physical activity

among international students attending colleges and universities in the United States. *College Student Journal, 42*(4), 1110-1117.

Taliaferro, L.A., Rienzo, B.A., Pigg Jr., M., Miller, D., & Dodd, V.J. (2008). Associations between physical activity and reduced rates of hopelessness, depression, and suicidal behavior among college students. *Journal of American College Health, 57*(4), 427-435.

Tam, C.F., Martinez, E., Tsai, S., Chang, L.C., Calderon, L., Davis, R., & Yeh, I. (1996). A comparison of dietary atherogenicities, energy balance, and physical activity levels of male and female college students. *Nutrition Research, 16*(11), 1861-1880.

Tammelin, T., Näyhä, S., Laitinen, J., Rintamäki, H., & Jävelin, M. (2003). Physical activity and social status in adolescence as predictors of physical inactivity in adulthood. *Preventative Medicine, 37*(4), 375-381.

Telama, R., Yang, X., Viikari, J., Välimäki, I., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21-year tracking study. *American Journal of Preventative Medicine, 28*(3), 267-273.

Thome, J., & Espelage, D.L. (2004). Relations among exercise, copying, disordered eating, and psychological health among college students. *Eating Behaviors, 5*(4), 337-351.

Tomporowski, P.D. (2003). Effects of acute bouts of exercise on cognition. *Acta Psychologica, 112*(3), 297-2324.

Trockel, M., Barnes, M., & Egget, D. (2000). Health-related variables and academic performance among first-year college students: Implications for sleep and other behaviors. *Journal of American College Health, 49*(3), 125-131.

U.S Department of Health and Human Services. (2000). *Healthy People 2010.* Retrieved from http://www.health.gov/healthypeople

U.S. Department of Health and Human Services. (2001). *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity 2001.* Retrieved from http://www.surgeongeneral.gov/topics/obesity/calltoaction/Calltoaction.pdf

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, and The President's Council on Physical Fitness and Sports. (1999). *Physical Activity and Health: A Report of the Surgeon General.* Retrieved from http://www.cdc.gov/nccdphp/sgr/pdf/sgrfull.pdf

U.S. Department of Health and Human Services, National Institute of Health, & National Institute on Alcohol Abuse and Alcoholism. (2007). *What colleges need to know now: An update on college drinking research* (NIH Publication No. 07-5010). Retrieved from http://www.collegedrinkingprevention.gov/1College_Bulletin-508_361C4E.pdf http://www.health.gov/dietaryguidelines/dga2005/document/pdf/DGA2005.pdf

Vail-Smith, K., Felts, W.M., & Becker, C. (2009). Relationship between sleep quality and health risk behaviors in undergraduate college students. *College Student Journal, 43*(3), 924-930.

Warner, M.J. (1995). Health center 2000: The mission development challenge. *Journal of American College Health, 44*(3), 131-133. Retrieved from Academic Search Complete database.

Wechsler, H., Lee, J.E., Nelson, T.F., & Kuo, M. (2002). Underage college students'

drinking behavior, access to alcohol, and the influence of deterrence policies. *Journal of American College Health, 50*(5), 223-236.

Yazedijan, A., Toews, M.L., Sevin, T., & Purswell, K.E. (2008). "It's a whole new world": A qualitative exploration of college students' definitions of and strategies for college success. *Journal of College Student Development, 49*(2), 141-154.

Zahran, H.S., Zack, M.M., Vernon-Smiley, M.E., & Hertz, M.F. (2007). Health-related quality of life and behaviors risky to health among adults aged 18-24 years in secondary or higher education—United States, 2003-2005. *Journal of Adolescent Health, 41*(4), 389-397.

Appendix A

OLD DOMINION UNIVERSITY
DARDEN COLLEGE OF EDUCATION
OFFICE OF THE DEAN
NORFOLK, VIRGINIA 23529-0156
PHONE: (757) 683-3938
FAX: (757) 683-5083

April 30, 2010 Proposal Number __**200902117**__

Professor Schwitzer:

Your proposal submission titled, **"College student adjustment and health behaviors"** has been deemed EXEMPT from IRB review by the Human Subjects Review Committee of the Darden College of Education. If any changes occur, especially methodological, notify the Chair of the DCOE HSRC, and supply any required addenda requested of you by the Chair. You may begin your research.

We have approved your request to pursue this proposal indefinitely, provided no modifications occur. Also note that if you are funded externally for this project in the future, you will likely have to submit to the University IRB for their approval as well.

PRIOR TO THE START OF YOUR STUDY, **you must send a signed and dated hardcopy of your exemption application submission to the address below.**
Thank you.

Edwin Gómez, Ph.D.
Associate Professor
Chair, Human Subjects Review Committee, DCOE
Human Movement Studies Department
Old Dominion University
2010 Student Recreation Center
Norfolk, VA 23529-0196
757-683-6309 (ph)
757-683-4270 (fx)

Appendix B

Research Questions	IV	DV	Method
RQ#1 To what degree does a relationship exist between a college student's physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?	**Physical activity behaviors** #29: On how many of the past seven days did you exercise or strength train?	**Academic adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (academics)? #63: What is your approximate cumulative GPA? #45: Within the past 12 months, have any of the following affected your academic performance? **Personal-emotional adjustment** #1: How would you describe your general health? #18: Within the past 12 months, have you taken any prescription drugs that were not prescribed to you? #26: How would you describe your weight? #30: Have you ever felt emotions that were _____? #31: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing emotional disturbances) #32: Have you ever been diagnosed with depression? #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (personal health issue, family problems, and sleep difficulties)? #37: Within the last 12 months, how would you rate the overall level of stress that you have experienced? #41: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing physical illnesses) #45:Within the last 12 moths, have any of the following affected your academic performance (anxiety, concern for a troubled friend or family member, depression, eating disorder problem, sleep difficulties, stress, homesick)?	Correlation

		Social adjustment #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (intimate relationships, other social relationships)? #45:Within the last 12 moths, have any of the following affected your academic performance (participation in activities, relationship difficulties, roommate difficulties)?	
RQ#2 To what degree does a relationship exist between a college student's eating/nutrition behavior and (a) academic, (b) personal-emotional, and (c) social adjustment?	**Eating and nutrition behaviors** #28: How many servings of fruits and vegetables do you normally have per day?	**Academic adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (academics)? #63: What is your approximate cumulative GPA? #45: Within the past 12 months, have any of the following affected your academic performance? **Personal-emotional adjustment** #1: How would you describe your general health? #18: Within the past 12 months, have you taken any prescription drugs that were not prescribed to you? #26: How would you describe your weight? #27: Are you trying to do any of the following about your weight? #30: Have you ever felt emotions that were _____? #31: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing emotional disturbances) #32: Have you ever been diagnosed with depression? #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (personal health issue, family problems, and sleep difficulties)? #37: Within the last 12 months, how would you rate the overall level of stress that you have experienced? #41: Within the past 12 months, have you been diagnosed or treated by a professional for any	Correlation

		of the following (listing physical illnesses) #45: Within the last 12 moths, have any of the following affected your academic performance (anxiety, concern for a troubled friend or family member, depression, eating disorder problem, sleep difficulties, stress, homesick)? **Social adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (intimate relationships, other social relationships)? #45: Within the last 12 moths, have any of the following affected your academic performance (participation in activities, relationship difficulties, roommate difficulties)?	
RQ#3 Is there a significant difference between college students who meet the minimum recommended levels of physical activity behavior and (a) academic, (b) personal-emotional, and (c) social adjustment and those who do not?	**Physical activity behaviors** #29: On how many of the past seven days did you exercise or strength train?	**Academic adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (academics)? #63: What is your approximate cumulative GPA? #45: Within the past 12 months, have any of the following affected your academic performance? **Personal-emotional adjustment** #1: How would you describe your general health? #18: Within the past 12 months, have you taken any prescription drugs that were not prescribed to you? #26: How would you describe your weight? #27: Are you trying to do any of the following about your weight? #30: Have you ever felt emotions that were _____? #31: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing emotional disturbances) #32: Have you ever been diagnosed with depression? #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (personal health issue, family	MANOVA

		problems, and sleep difficulties)? #37: Within the last 12 months, how would you rate the overall level of stress that you have experienced? #41: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing physical illnesses) #45:Within the last 12 moths, have any of the following affected your academic performance (anxiety, concern for a troubled friend or family member, depression, eating disorder problem, sleep difficulties, stress, homesick)? **Social adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (intimate relationships, other social relationships)? #45:Within the last 12 moths, have any of the following affected your academic performance (participation in activities, relationship difficulties, roommate difficulties)?	
RQ#3 Is there a significant difference between college students who meet the minimum recommended daily levels of fruit and vegetable consumption and (a) academic, (b) personal-emotional, and (c) social adjustment and those who do not?	**Eating and nutrition behaviors** #28: How many servings of fruits and vegetables do you normally have per day?	**Academic adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (academics)? #63: What is your approximate cumulative GPA? #45: Within the past 12 months, have any of the following affected your academic performance? **Personal-emotional adjustment** #1: How would you describe your general health? #18: Within the past 12 months, have you taken any prescription drugs that were not prescribed to you? #26: How would you describe your weight? #27: Are you trying to do any of the following about your weight? #30: Have you ever felt emotions that were _____? #31: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing emotional	MANOVA

		disturbances) #32: Have you ever been diagnosed with depression? #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (personal health issue, family problems, and sleep difficulties)? #37: Within the last 12 months, how would you rate the overall level of stress that you have experienced? #41: Within the past 12 months, have you been diagnosed or treated by a professional for any of the following (listing physical illnesses) #45:Within the last 12 moths, have any of the following affected your academic performance (anxiety, concern for a troubled friend or family member, depression, eating disorder problem, sleep difficulties, stress, homesick)? **Social adjustment** #33: Within the last 12 months, have any of the following been traumatic or very difficult for you to handle (intimate relationships, other social relationships)? #45:Within the last 12 moths, have any of the following affected your academic performance (participation in activities, relationship difficulties, roommate difficulties)?	

Appendix C
NCHA-II Survey

ACHA

American College Health Association **National College Health Assessment**

NCHA II

Instructions:

The following questions ask about various aspects of your health.

To answer the questions, fill in the oval that corresponds to your response.

Select only one response unless instructed otherwise.

Use a No. 2 pencil or blue or black ink pen only. Do not use pens with ink that soaks through the paper. CORRECT: ● INCORRECT: ✓ ✗ ▬ ◦

This survey is completely voluntary. You may choose not to participate or not to answer any specific question. You may skip any question you are not comfortable in answering.

Please make no marks of any kind on the survey which could identify you individually.

Composite data will then be shared with your campus for use in health promotion activities.

Thank you for taking the time and thought to complete this survey. We appreciate your participation!

American College Health Association

National College Health Assessment

SERIAL #

3/8" spine perf

Health, Health Education and Safety

1. How would you describe your general health?

○ Excellent ○ Very good ○ Good ○ Fair ○ Poor ○ Don't know

(Please mark the appropriate column for each question to the right)	2. Have you received information on the following topics from your college or university?		3. Are you interested in receiving information on the following topics from your college or university?	
	No	Yes	No	Yes
Alcohol and other drug use	○	○	○	○
Cold/Flu/Sore throat	○	○	○	○
Depression/Anxiety	○	○	○	○
Eating disorders	○	○	○	○
Grief and loss	○	○	○	○
How to help others in distress	○	○	○	○
Injury prevention	○	○	○	○
Nutrition	○	○	○	○
Physical activity	○	○	○	○
Pregnancy prevention	○	○	○	○
Problem use of Internet/computer games	○	○	○	○
Relationship difficulties	○	○	○	○
Sexual assault/Relationship violence prevention	○	○	○	○
Sexually transmitted disease/infection (STD/I) prevention	○	○	○	○
Sleep difficulties	○	○	○	○
Stress reduction	○	○	○	○
Suicide prevention	○	○	○	○
Tobacco use	○	○	○	○
Violence prevention	○	○	○	○

4. Within the last 12 months, how often did you:

(Please mark the appropriate column for each row)

	Always	Most of the time	Sometimes	Rarely	Never	N/A, did not do this activity within the last 12 months
Wear a seatbelt when you rode in a car?	○	○	○	○	○	○
Wear a helmet when you rode a bicycle?	○	○	○	○	○	○
Wear a helmet when you rode a motorcycle?	○	○	○	○	○	○
Wear a helmet when you were inline skating?	○	○	○	○	○	○

5. Within the last 12 months:

(Please mark the appropriate column for each row)

	Yes	No
Were you in a physical fight?	○	○
Were you physically assaulted (do not include sexual assault)?	○	○
Were you verbally threatened?	○	○
Were you sexually touched without your consent?	○	○
Was sexual penetration attempted (vaginal, anal, oral) without your consent?	○	○
Were you sexually penetrated (vaginal, anal, oral) without your consent?	○	○
Were you a victim of stalking (e.g., waiting for you outside your classroom, residence, or office; repeated emails/phone calls)?	○	○

3/8" spine perf

6. **Within the last 12 months,** have you been in an intimate (coupled/partnered) relationship that was:

(Please mark the appropriate column for each row)

	Yes	No
Emotionally abusive? (e.g., called derogatory names, yelled at, ridiculed)	○	○
Physically abusive? (e.g., kicked, slapped, punched)	○	○
Sexually abusive? (e.g., forced to have sex when you didn't want it, forced to perform or have an unwanted sexual act performed on you)	○	○

7. **How safe do you feel:**

(Please mark the appropriate column for each row)

	Very safe	Somewhat safe	Somewhat unsafe	Not safe at all
On this campus (daytime)?	○	○	○	○
On this campus (nighttime)?	○	○	○	○
In the community surrounding this school (daytime)?	○	○	○	○
In the community surrounding this school (nighttime)?	○	○	○	○

Alcohol, Tobacco, and Drugs

8. **Within the last 30 days,** on how many days did you use:

(Please mark the appropriate column for each row)

	Never used	Have used, but not in last 30 days	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Cigarettes	○	○	○	○	○	○	○	○
Tobacco from a water pipe (hookah)	○	○	○	○	○	○	○	○
Cigars, little cigars, clove cigarettes	○	○	○	○	○	○	○	○
Smokeless tobacco	○	○	○	○	○	○	○	○
Alcohol (beer, wine, liquor)	○	○	○	○	○	○	○	○
Marijuana (pot, weed, hashish, hash	○	○	○	○	○	○	○	○
Cocaine (crack, rock, freeba	○	○	○	○	○	○	○	○
Methamphetamine (crys meth, ice,	○	○	○	○	○	○	○	○
Other amphetamines (d	○	○	○	○	○	○	○	○
Sedatives (downers, ludes)	○	○	○	○	○	○	○	○
Hallucinogens (LSD, PCP)	○	○	○	○	○	○	○	○
Anabolic steroids (Testosterone)	○	○	○	○	○	○	○	○
Opiates (heroin, smack)	○	○	○	○	○	○	○	○
Inhalants (glue, solvents, gas)	○	○	○	○	○	○	○	○
MDMA (Ecstasy)	○	○	○	○	○	○	○	○
Other club drugs (GHB, Ketamine, Rohypnol)	○	○	○	○	○	○	○	○
Other illegal drugs	○	○	○	○	○	○	○	○

3/8" spine perf

PLEASE DO NOT WRITE IN THIS AREA

SERIAL #

9. Within the last 30 days, how often do you think the typical student at your school used:

(State your best estimate; Please mark the appropriate column for each row)

	Never used	Have used, but not in last 30 days	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Cigarettes	○	○	○	○	○	○	○	○
Tobacco from a water pipe (hookah)	○	○	○	○	○	○	○	○
Cigars, little cigars, clove cigarettes	○	○	○	○	○	○	○	○
Smokeless tobacco	○	○	○	○	○	○	○	○
Alcohol (beer, wine, liquor)	○	○	○	○	○	○	○	○
Marijuana (pot, weed, hashish, hash oil)	○	○	○	○	○	○	○	○
Cocaine (crack, rock, freebase)	○	○	○	○	○	○	○	○
Methamphetamine (crystal meth, ice, crank)	○	○	○	○	○	○	○	○
Other amphetamines (diet pills, bennies)	○	○	○	○	○	○	○	○
Sedatives (downers, ludes)	○	○	○	○	○	○	○	○
Hallucinogens (LSD, PCP)	○	○	○	○	○	○	○	○
Anabolic steroids (Testosterone)	○	○	○	○	○	○	○	○
Opiates (heroin, smack)	○	○	○	○	○	○	○	○
Inhalants (glue, solvents, gas)	○	○	○	○	○	○	○	○
MDMA (Ecstasy)	○	○	○	○	○	○	○	○
Other club drugs (GHB, Ketamine, Rohypnol)	○	○	○	○	○	○	○	○
Other illegal drugs	○	○	○	○	○	○	○	○

One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz. glass of wine, or a shot of liquor straight or in a mixed drink.

10. The last time you "partied"/socialized how many drinks of alcohol did you have? (If you did not drink alcohol, please enter 00. If less than 10, enter 01, 02, 03, etc.)

DRINKS

⓪	⓪	
①	①	
②	②	
③	③	
④	④	
⑤	⑤	
⑥	⑥	
⑦	⑦	
⑧	⑧	
⑨	⑨	

11. The last time you "partied"/socialized over how many hours did you drink alcohol? (If you did not drink alcohol, please enter 00. If less than 10, enter 01, 02, 03, etc.)

HOURS

⓪	⓪
①	①
②	②
③	③
④	④
⑤	⑤
⑥	⑥
⑦	⑦
⑧	⑧
⑨	⑨

12. How many drinks of alcohol do you think the typical student at your school had the last time he/she "partied"/socialized? (If you think the typical student at your school does not drink alcohol, please enter 00. If less than 10, enter 01, 02, 03, etc.)

DRINKS

⓪	⓪
①	①
②	②
③	③
④	④
⑤	⑤
⑥	⑥
⑦	⑦
⑧	⑧
⑨	⑨

13. Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting?

○ N/A, don't drink	○ 2 times	○ 5 times	○ 8 times
○ None	○ 3 times	○ 6 times	○ 9 times
○ 1 time	○ 4 times	○ 7 times	○ 10 or more times

14. Within the last 30 days, did you:

(Please mark the appropriate column for each row)

	Yes	No	N/A, don't drink	N/A, don't drive
Drive after drinking any alcohol at all	○	○	○	○
Drive after drinking five or more drinks of alcohol	○	○	○	○

3/8" spine perf

15. During the last 12 months, when you "partied"/socialized, how often did you:

(Please mark the appropriate column for each row)

Rarely Sometimes
Never Most of the time
N/A, don't drink Always

Alternate non-alcoholic with alcoholic beverages	○○○○○○
Avoid drinking games	○○○○○○
Choose not to drink alcohol	○○○○○○
Determine, in advance, not to exceed a set number of drinks	○○○○○○
Eat before and/or during drinking	○○○○○○
Have a friend let you know when you have had enough	○○○○○○
Keep track of how many drinks you were having	○○○○○○
Pace your drinks to 1 or fewer per hour	○○○○○○
Stay with the same group of friends the entire time you were drinking	○○○○○○
Stick with only one kind of alcohol when drinking	○○○○○○
Use a designated driver	○○○○○○

16. Within the last 12 months, have you experienced any of the following as a consequence of your drinking?

(Please mark the appropriate column for each row)

Yes
No
N/A, don't drink

Did something you later regretted	○○○
Forgot where you were or what you did	○○○
Got in trouble with the police	○○○
Had sex with someone **without giving** your consent	○○○
Had sex with someone **without getting** their consent	○○○
Had unprotected sex	○○○
Physically injured yourself	○○○
Physically injured another person	○○○
Seriously considered suicide	○○○

3/8" spine perf

17. Within the last 30 days, what percent of students at your school used:
State your best estimate. (If less than 10, please enter 00, 01, 02, etc.)

Cigarettes % Used	Alcohol % Used	Marijuana % Used
⓪⓪	⓪⓪	⓪⓪
①①	①①	①①
②②	②②	②②
③③	③③	③③
④④	④④	④④
⑤⑤	⑤⑤	⑤⑤
⑥⑥	⑥⑥	⑥⑥
⑦⑦	⑦⑦	⑦⑦
⑧⑧	⑧⑧	⑧⑧
⑨⑨	⑨⑨	⑨⑨

18. Within the last 12 months, have you taken any of the following prescription drugs that were not prescribed to you?

(Please mark the appropriate column for each row)

Yes
No

Antidepressants (e.g., Celexa, Lexapro, Prozac, Wellbutrin, Zoloft)	○○
Erectile dysfunction drugs (e.g., Viagra, Cialis, Levitra)	○○
Pain killers (e.g., OxyContin, Vicodin, Codeine)	○○
Sedatives (e.g., Xanax, Valium)	○○
Stimulants (e.g., Ritalin, Adderall)	○○

PLEASE DO NOT WRITE IN THIS AREA

SERIAL #

Sex Behavior and Contraception

19. Within the last 12 months, with how many partners have you had oral sex, vaginal intercourse, or anal intercourse? (If you did not have a sex partner within the last 12 months, please enter 00. If less than 10, enter 01, 02, 03, etc.) →

PARTNERS

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

20. Within last 12 months, did you have sexual partner(s) who were:

(Please mark the appropriate column for each row)

	Yes	No
Female	○	○
Male	○	○
Transgender	○	○

21. Within the last 30 days, did you have:

(Please mark the appropriate column for each row)

	Yes	No, have done this sexual activity in the past but not in the last 30 days	No, have never done this sexual activity
Oral sex?	○	○	○
Vaginal intercourse?	○	○	○
Anal intercourse?	○	○	○

22. Within the last 30 days, how often did you or your partner(s) use a condom or other protective barrier (e.g., male condom, female condom, dam, glove) during:

(Please mark the appropriate column for each row)

	Have not done this sexual activity during the last 30 days	N/A, never did this sexual activity	Never	Rarely	Sometimes	Most of the time	Always
Oral sex?	○	○	○	○	○	○	○
Vaginal intercourse?	○	○	○	○	○	○	○
Anal intercourse?	○	○	○	○	○	○	○

CONDOM/ BARRIER USE

23A. Did you or your partner use a method of birth control to prevent pregnancy the last time you had vaginal intercourse?

- ○ Yes (continue to item 23B)
- ○ N/A, have not had vaginal intercourse (skip to item 24)
- ○ No, have not had vaginal intercourse that could result in a pregnancy (skip to item 24)
- ○ No, did not want to prevent pregnancy (skip to item 24)
- ○ No, did not use any birth control method (skip to item 24)
- ○ Don't know (skip to item 24)

23B. Please indicate whether or not you or your partner used each of the following methods of birth control to prevent pregnancy the last time you had vaginal intercourse. (Please mark the appropriate column for each row)

	Yes	No		Yes	No
Birth control pills (monthly or extended cycle)	○	○	Diaphragm or cervical cap	○	○
Birth control shots	○	○	Contraceptive sponge	○	○
Birth control implants	○	○	Spermicide (e.g., foam, jelly, cream)	○	○
Birth control patch	○	○	Fertility awareness (e.g., calendar, mucous, basal body temperature)	○	○
Vaginal ring	○	○	Withdrawal	○	○
Intrauterine device (IUD)	○	○	Sterilization (e.g., hysterectomy, tubes tied, or vasectomy)	○	○
Male condom	○	○	Other method	○	○
Female condom	○	○			

3/8" spine perf

24. Within the last 12 months, have you or your partner(s) used emergency contraception ("morning after pill")?

- ○ N/A, have not had vaginal intercourse in the last 12 months
- ○ No
- ○ Yes
- ○ Don't know

25. Within the last 12 months, have you or your partner(s) become pregnant?

- ○ N/A, have not had vaginal intercourse in the last 12 months
- ○ No
- ○ Yes, unintentionally
- ○ Yes, intentionally
- ○ Don't know

Weight, Nutrition, and Exercise

26. How do you describe your weight?

- ○ Very underweight
- ○ Slightly underweight
- ○ About the right weight
- ○ Slightly overweight
- ○ Very overweight

27. Are you trying to do any of the following about your weight?

- ○ I am not trying to do anything about my weight
- ○ Stay the same weight
- ○ Lose weight
- ○ Gain weight

28. How many servings of fruits and vegetables do you usually have per day?
(1 serving = 1 medium piece of fruit; 1/2 cup fresh, frozen, or canned fruits/vegetables; 3/4 cup fruit/vegetable juice; 1 cup salad greens; or 1/4 cup dried fruit)

○ 0 servings per day ○ 1–2 servings per day ○ 3–4 servings per day ○ 5 or more servings per day

29. On how many of the past 7 days did you:

(Please mark the appropriate column for each row)

	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Do **moderate-intensity** cardio or aerobic exercise (caused a noticeable increase in heart rate, such as a brisk walk) for at least **30 minutes**?	○	○	○	○	○	○	○	○
Do **vigorous-intensity** cardio or aerobic exercise (caused large increases in breathing or heart rate, such as jogging) for at least **20 minutes**?	○	○	○	○	○	○	○	○
Do 8-10 strength training exercises (such as resistance weight machines) for 8-12 repetitions each?	○	○	○	○	○	○	○	○

Mental Health

30. Have you ever:

(Please mark the appropriate column for each row)

	Yes, in the last 12 months	Yes, in the last 30 days	Yes, in the last 2 weeks	No, not in last 12 months	No, never
Felt things were hopeless	○	○	○	○	○
Felt overwhelmed by all you had to do	○	○	○	○	○
Felt exhausted (not from physical activity)	○	○	○	○	○
Felt very lonely	○	○	○	○	○
Felt very sad	○	○	○	○	○
Felt so depressed that it was difficult to function	○	○	○	○	○
Felt overwhelming anxiety	○	○	○	○	○
Felt overwhelming anger	○	○	○	○	○
Intentionally cut, burned, bruised, or otherwise injured yourself	○	○	○	○	○
Seriously considered suicide	○	○	○	○	○
Attempted suicide	○	○	○	○	○

3/8" spine perf

31. Within the last 12 months, have you been diagnosed or treated by a professional for any of the following?

(Please mark the appropriate column for each row)

	Yes, other treatment	Yes, treated with medication and psychotherapy	Yes, treated with psychotherapy	Yes, treated with medication	Yes, diagnosed but not treated	No
Anorexia	○	○	○	○	○	○
Anxiety	○	○	○	○	○	○
Attention Deficit and Hyperactivity Disorder (ADHD)	○	○	○	○	○	○
Bipolar Disorder	○	○	○	○	○	○
Bulimia	○	○	○	○	○	○
Depression	○	○	○	○	○	○
Insomnia	○	○	○	○	○	○
Other sleep disorder	○	○	○	○	○	○
Obsessive Compulsive Disorder (OCD)	○	○	○	○	○	○
Panic attacks	○	○	○	○	○	○
Phobia	○	○	○	○	○	○
Schizophrenia	○	○	○	○	○	○
Substance abuse or addiction (alcohol or other drugs)	○	○	○	○	○	○
Other addiction (e.g., gambling, internet, sexual)	○	○	○	○	○	○
Other mental health condition	○	○	○	○	○	○

32. Have you ever been diagnosed with depression? ○ No ○ Yes

33. Within the last 12 months, have any of the following been traumatic or very difficult for you to handle?

(Please mark the appropriate column for each row)

	Yes	No
Academi	○	○
Ca er-rela	○	○
f a fa mber or friend	○	○
F ble	○	○
In ationships	○	○
O social relationships	○	○
Finances	○	○
Health problem of a family member or partner	○	○
Personal appearance	○	○
Personal health issue	○	○
Sleep difficulties	○	○
Other	○	○

34. Have you ever received psychological or mental health services from any of the following?

(Please mark the appropriate column for each row)

	Yes	No
Counselor/Therapist/Psychologist	○	○
Psychiatrist	○	○
Other medical provider (e.g., physician, nurse practitioner)	○	○
Minister/Priest/Rabbi/Other clergy	○	○

3/8" spine perf

247487–3/3

PLEASE DO NOT WRITE IN THIS AREA

SERIAL #

35. **Have you ever received psychological or mental health services from your current college/university's Counseling or Health Service?**
○ No ○ Yes

36. **If in the future you were having a personal problem that was really bothering you, would you consider seeking help from a mental health professional?**
○ No ○ Yes

37. **Within the last 12 months, how would you rate the overall level of stress you have experienced?**
○ No stress
○ Less than average stress
○ Average stress
○ More than average stress
○ Tremendous stress

Physical Health

38. **Within the last 30 days, did you do any of the following?**

(Please mark the appropriate column for each row)	No	Yes
Exercise to lose weight	○	○
Diet to lose weight	○	○
Vomit or take laxatives to lose weight	○	○
Take diet pills to lose weight	○	○

39. **Have you:**

(Please mark the appropriate column for each row)	No	Yes	Don't know
Had a dental exam and cleaning in the last 12 m...?	○	○	○
(Males) Performed testicular self exam in t... ys?	○	○	○
(Females) Performed breast self exa... in the ...da...?	○	○	○
(Females) Had a routine gynecolo... exam ... t 12 months?	○	○	○
Used sunscreen regularly with sun... ...p... ...?	○	○	○
Ever been tested for H... ...mmun... ...ency Virus (HIV) infection?	○	○	○

40. **Have you received the following vaccinations (shots)?**

(Please mark the appropriate column for each row)	No	Yes	Don't know
Hepatitis B	○	○	○
Human Papillomavirus/HPV (cervical cancer vaccine)	○	○	○
Influenza (the flu) in the last 12 months (shot or nasal mist)	○	○	○
Measles, Mumps, Rubella	○	○	○
Meningococcal disease (meningococcal meningitis)	○	○	○
Varicella (chicken pox)	○	○	○

3/8" spine perf

41. Within the last 12 months, have you been diagnosed or treated by a professional for any of the following?

(Please mark the appropriate column for each row)	Yes	No		Yes	No
Allergies	○	○	High blood pressure	○	○
Asthma	○	○	High cholesterol	○	○
Back pain	○	○	Human Immunodeficiency Virus (HIV)	○	○
Broken bone/Fracture/Sprain	○	○	Irritable Bowel Syndrome (IBS)	○	○
Bronchitis	○	○	Migraine headache	○	○
Chlamydia	○	○	Mononucleosis	○	○
Diabetes	○	○	Pelvic Inflammatory Disease (PID)	○	○
Ear infection	○	○	Repetitive stress injury		
Endometriosis	○	○	(e.g., carpal tunnel syndrome)	○	○
Genital herpes	○	○	Sinus infection	○	○
Genital warts/Human Papillomavirus (HPV)	○	○	Strep throat	○	○
Gonorrhea	○	○	Tuberculosis	○	○
Hepatitis B or C	○	○	Urinary tract infection	○	○

42. On how many of the past 7 days did you get enough sleep so that you felt rested when you woke up in the morning?

○ 0 days ○ 1 day ○ 2 days ○ 3 days ○ 4 days ○ 5 days ○ 6 days ○ 7 days

43. People sometimes feel sleepy during the daytime. In the past 7 days, how much of a problem have you had with sleepiness (feeling sleepy, struggling to stay awake) during your daytime activities?

○ Not at all
○ A little problem
○ More than a little problem
○ A big problem
○ A very big problem

44. In the past 7 days, how often have you:

(Please mark the appropriate column for each row)	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Awakened too early in the morning and couldn't get back to sleep?	○	○	○	○	○	○	○	○
Felt tired, dragged out, or sleepy during the day?	○	○	○	○	○	○	○	○
Gone to bed because you just could not stay awake any longer?	○	○	○	○	○	○	○	○
Had an extremely hard time falling asleep?	○	○	○	○	○	○	○	○

3/8" spine perf

PLEASE DO NOT WRITE IN THIS AREA

SERIAL #

Impediments to Academic Performance

(Please select the most serious outcome for each item below)

Significant disruption in thesis, dissertation, research, or practicum work
Received an incomplete or dropped the course
Received a lower grade in the course
Received a lower grade on an exam or important project
I have experienced this issue but my academics have not been affected
This did not happen to me/not applicable

45. Within the last 12 months, have any of the following affected your academic performance?

Alcohol use	○○○○○○
Allergies	○○○○○○
Anxiety	○○○○○○
Assault (physical)	○○○○○○
Assault (sexual)	○○○○○○
Attention Deficit and Hyperactivity Disorder (ADHD)	○○○○○○
Cold/Flu/Sore throat	○○○○○○
Concern for a troubled friend or family member	○○○○○○
Chronic health problem or serious illness (e.g., diabetes, asthma, cancer)	○○○○○○
Chronic pain	○○○○○○
Death of a friend or family member	○○○○○○
Depression	○○○○○○
Discrimination (e.g., homophobia, racism, sexism)	○○○○○○
Drug use	○○○○○○
Eating disorder/problem	○○○○○○
Finances	○○○○○○
Gambling	○○○○○○
Homesickness	○○○○○○
Injury (fracture, sprain, strain, cut)	○○○○○○
Internet use/computer games	○○○○○○
Learning disability	○○○○○○
Participation in extracurricular activities (e.g., [illegible] clubs, organizations, athletics)	○○○○○○
Pregnancy (yours or your partner's)	○○○○○○
Relationship difficulties	○○○○○○
Roommate difficulties	○○○○○○
Sexually transmitted d[illegible]ase/infect[illegible]	○○○○○○
Sinus infection/Ear inf[illegible]/Strep throat	○○○○○○
Sleep difficulties	○○○○○○
Stress	○○○○○○
Work	○○○○○○
Other (please specify _____)	○○○○○○

3/8" spine perf

Demographic Characteristics

46. How old are you? → Years

47. What is your gender?
- ○ Female
- ○ Male
- ○ Transgender

48. What is your sexual orientation?
- ○ Heterosexual
- ○ Gay/Lesbian
- ○ Bisexual
- ○ Unsure

49. What is your height in feet and inches? → HEIGHT: Ft. / Inch

50. What is your weight in pounds? → WEIGHT: Pounds

51. What is your year in school?

- ○ 1st year undergraduate
- ○ 2nd year undergraduate
- ○ 3rd year undergraduate
- ○ 4th year undergraduate
- ○ 5th year or more undergraduate
- ○ Graduate or professional
- ○ Not seeking a degree
- ○ Other

52. What is your enrollment status?

○ Full-time ○ Part-time ○ Other

53. Have you transferred to this college or university within the last 12 months?

○ No ○ Yes

54. How do you usually describe yourself? *(Mark all that apply)*

- ○ White, non Hispanic (includes Middle Eastern)
- ○ Black, non Hispanic
- ○ Hispanic or Latino/a
- ○ Asian or Pacific Islander
- ○ American Indian, Alaskan Native, or Native Hawaiian
- ○ Biracial or Multiracial
- ○ Other

55. Are you an international student?

○ No ○ Yes

56. What is your relationship status?

- ○ Not in a relationship
- ○ In a relationship but not living together
- ○ In a relationship and living together

57. What is your marital status?

- ○ Single ○ Divorced
- ○ Married/Partnered ○ Other
- ○ Separated

58. Where do you currently live?

- ○ Campus residence hall
- ○ Fraternity or sorority house
- ○ Other college/university housing
- ○ Parent/guardian's home
- ○ Other off-campus housing
- ○ Other

59. Are you a member of a social fraternity or sorority? (e.g., National Interfraternity Conference, National Panhellenic Conference, National Pan-Hellenic Council, National Association of Latino Fraternal Organizations)

○ No ○ Yes

60. How many hours a week do you work for pay?

- ○ 0 hours
- ○ 1–9 hours
- ○ 10–19 hours
- ○ 20–29 hours
- ○ 30–39 hours
- ○ 40 hours
- ○ More than 40 hours

61. How many hours a week do you volunteer?

- ○ 0 hours
- ○ 1–9 hours
- ○ 10–19 hours
- ○ 20–29 hours
- ○ 30–39 hours
- ○ 40 hours
- ○ More than 40 hours

62. What is your primary source of health insurance?

- ○ My college/university sponsored plan
- ○ My parents' plan
- ○ Another plan
- ○ I don't have health insurance
- ○ I am not sure if I have health insurance

63. What is your approximate cumulative grade average?

○ A ○ B ○ C ○ D/F ○ N/A

64. Within the last 12 months, have you participated in organized college athletics at any of the following levels?

(Please mark the appropriate column for each row)	Yes	No
Varsity	○	○
Club sports	○	○
Intramurals	○	○

65. Do you have any of the following disabilities or medical conditions?

(Please mark the appropriate column for each row)	Yes	No
Attention Deficit and Hyperactivity Disorder (ADHD)	○	○
Chronic illness (e.g., cancer, diabetes, auto-immune disorders)	○	○
Deaf/Hard of hearing	○	○
Learning disability	○	○
Mobility/Dexterity disability	○	○
Partially sighted/Blind	○	○
Psychiatric condition	○	○
Speech or language disorder	○	○
Other disability	○	○

THANK YOU FOR COMPLETING THIS SURVEY

PLEASE DO NOT WRITE IN THIS AREA

SERIAL #

3/8" spine perf