

2015

# Race/Ethnicity, Diet, and Physical Activity Behavior Among College Students

Ronda Herbert  
*Walden University*

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# Walden University

College of Health Sciences

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Ronda Herbert

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Walden University

2015

Abstract

Race/Ethnicity, Diet, and Physical Activity Behavior Among College Students

by

Ronda Veronica Herbert

BSN, University of the Virgin Islands, 2002

MSPH, Walden University, 2008

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

November 2015

## Abstract

Scarce knowledge exists about the lifestyle of college students from heterogeneous racial/ethnic backgrounds and how race/ethnicity may influence their diet and physical activity behaviors. College students, especially those who are members of minority groups, are at risk for unhealthy lifestyles resulting in negative health outcomes. The purpose of this quantitative study was to examine the role of racial diversity on dietary and physical activity habits. The study was guided by social cognitive theory, and the research questions examined the relationship between race/ethnicity on diet and physical activity in a multiracial ethnic population. The study research design was a quantitative cross-sectional survey using a 34-item questionnaire on a convenience sample of 307 college students. Statistical analysis consisted of descriptive statistics to characterize the sample and logistic regression was used to examine the odds of race/ethnicity predicting meal consumption and physical activity behaviors as well as parental influence on meal consumption. The results indicated that only some race/ethnic groups (Hispanic/Latino, Caribbean) predicted frequency of breakfast meal consumption but all race/ethnic groups predicted dinner meal consumption. Race/ethnicity did not predict lunch meal consumption. Race/ethnicity did not predict physical activity. Parental influence did not have any of the race/ethnicity groups on their meal consumption. The positive social change implications from this study may help explain situational and sociocultural factors that affect lifestyle in this population to policy creators and health education specialists; these stakeholders, in turn, may create specific intervention programs for each race/ethnic group to increase healthy behaviors.

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## Dedication

To my Lord and Savior Jesus Christ, who has given me the wisdom, knowledge, endurance, and understanding to complete the journey. To my mother, Mrs. Wilhelmina Herbert, who has taught me to be persistent and to never give up.

## Acknowledgments

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## Chapter 1: Introduction of the Study

### **Background of Study**

The future health of American youth is of concern because of the increasing rate of obesity (Ajibade, 2011). American society has promoted environments for increased food and portion intake, unhealthful foods, and physical inactivity (Centers for Disease Control and Prevention [CDC], 2010a). Individuals whose weight is greater than what is considered normal for their height are defined as *obese* (CDC, 2010a). According to CDC, obesity is associated with an increase in chronic diseases and other health problems and is one of the leading health indicators. Many Americans are experiencing this epidemic (CDC, 2010a).

According to the CDC (2010a), obesity is a result of individuals consuming excess calories in their diet without getting enough physical activity to burn excess calories. Obesity increases an individual's risk for diabetes, stroke, cardiovascular disease, and other chronic diseases (CDC, 2010a). The United States has experienced an obesity epidemic amongst its youth; thus, the risk for chronic conditions has increased for many young people as the age of onset of such diseases has decreased. The focus of obesity research has been on school-age children and adults; not much literature has focused on minority young adults of college age (i.e., 18-24 years; McArthur & Raedeke, 2009). The CDC sponsors a surveillance system, the Behavioral Risk Factor Surveillance System (BRFSS), which provides data on a state level, including risk factors and self-reported disease (CDC, 2010b). Among these data, consumption of fruits and vegetables and frequency and intensity of physical activity are available (CDC, 2010b).

### **Influence of Race on Risk Factors**

Racial/ethnic minorities are developing obesity-related diseases at much higher rates than the White population (CDC, 2010c). Typically, data are analyzed by race in aggregate groups, such as African American, Hispanic, Asians/Pacific Islander, and Native American/Alaskan, and the sociocultural factors and family lifestyle that race/ethnicity represents are not captured through this aggregate. A much more diverse Black population lives in the U.S. territory of the Virgin Islands compared to the U.S. mainland (U.S. Census, 2011). Migration to the U.S. Virgin Islands from the other Caribbean islands, the U.S. mainland, Haiti, and Santo Domingo has resulted in a racially and ethnically mixed population (U.S. Census, 2011). The total population of the U.S. Virgin Islands in 2010 was 108,612 (U.S. Census, 2011). In 2009, a fourth (26%) of the population was under 15 years of age, whereas the great majority of the population (64.4%) was between 15 and 64 years and 9.5% were 65 years and older (Virgin Islands Moving Center, 2009). At present, the estimated population of college students aged 18-24 years is 12% (Behavioral Risk Factor Surveillance Survey [BRFSS], 2010).

The latest statistics on obesity, physical activity, and consumption of fruits and vegetables are available for the year 2010, and indicate a declining pattern in the Virgin Islands compared to the mainland population (CDC, 2010a). The data are representative of the population provided by the BRFSS. The obesity rate for 2010 was 30% using a definition of body mass index of 30 or greater (CDC, 2010a). The overall overweight and obesity rate was 66.2%. Surprisingly, more men (67.9%) were considered obese or overweight as compared to women (64.7%). The CDC (2010f) reported 57.3% of the

Virgin Islands population having a sedentary lifestyle—that is, not participating in at least 30 minutes of physical activity daily. According to State Health Facts (2011), in terms of race/ethnicity, the group with the largest overweight/obesity rate in the Virgin Islands was Hispanics (78.6%) followed by Blacks (67%); the rate of obesity and overweight was lowest among Whites (49.7%). Overall, 42.7% reported participating in moderate or strenuous physical activity (State Health Facts, 2011). The CDC (2010) reported that in 2009, 71.4% of the Virgin Islands population consumed fewer than five servings of fruits and vegetables daily.

### **College Student Population**

According to CDC (2010g), 52.7% of college students in the Virgin Islands did not participate in 30 minutes of activity daily, and 32% consumed fewer than five servings of fruits and vegetables daily. Data for the Virgin Islands population showed that consumption of more than five servings of fruits and vegetables daily was most common among Whites (31.5%) and least common among Hispanics (24.8%; CDC, 2010g). McArthur and Raedeke (2009) found that 17% of college students were sedentary; 33% reported some activity, and 50% were active. McArthur and Raedeke reported that more than one-fourth of the students were overweight. Black students were of particular concern because they were the least active group and therefore at greater risk for chronic diseases. In addition, the rate of physical activity was higher in Whites (McArthur & Raedeke, 2009).

This study was significant because it examined how the diversity of race influences diet and physical activity among this racially heterogeneous population.

Unlike prior studies, the heterogeneity of racial groups in the Virgin Islands constitutes strong social, cultural, religious, and class roots. For example, Hispanics constitute about a fourth of the population, but the majority are of mixed races, followed by Black, and very few identify themselves as White. The influence of race on college students' physical activity choices has not been studied extensively, and most of the studies on race in the United States focus on race as a statistical aggregate (McArthur & Raedeke, 2009).

Weight gain is a problem among college students and has received increased attention in the literature (Ajibade, 2011). According to Ajibade (2011), as students' transition from high school to college, they gain weight, so there is a need to address this environmental issue where there is access to this population. There are numerous universities with a large number of youth where this issue can be studied, and policy makers can develop interventions to improve health among high-risk populations when the correlates of physical activity and diet are examined (Ajibade, 2011).

Using prevention measures, it is important to teach college students about healthy habits before bad health habits develop. College students can influence health behaviors among their peers and have a potential influence in their community. If college students are taught behaviors to prevent overweight and obesity, they are likely to practice good health behaviors for the rest of their adult lives. If race influences physical and dietary choices, then it is important to implement interventions based on ethnic factors that can benefit specific groups and reduce obesity rates.



## **Problem Statement**

College students, especially those who are members of minority groups, are at risk for leading unhealthy lifestyles resulting in negative health outcomes created by inadequate dietary intake and physical inactivity (Neumark-Sztainer, Larson, Fulkerson, Eisenberg, & Story, 2010). Public health officials are concerned about this issue because unhealthy behaviors may lead to obesity, heart disease, cancer, diabetes, and stroke (CDC, 2013). The occurrence of physical inactivity is greater in racial minorities compared to any other subgroup, yet racial differences in health behaviors among college students have not been studied conclusively (McArthur & Raedeke, 2009). While the literature has focused on the unhealthy behaviors of school-aged children and adults, research on the unhealthy behaviors of minority college-age young adults (18-23 years of age) is lacking (McArthur & Raedeke, 2009). Further, not much is known about the lifestyle of college students from racially/ethnically heterogeneous backgrounds and how the transition to the campus environment and new situations affects their behavioral capability to control their diet and physical activity (McArthur & Raedeke, 2009). The relationship between race physical activity and dietary choices, has received some to moderate attention; however, the association of race with these choices has not been examined in the context of the transition from living with parents to living or being away from home most of the time (McArthur & Raedeke, 2009). This study's research problem concerned how racial/cultural differences manifest themselves through the impact of the social cognitive theory constructs of environment (availability and frequency), situation (students' knowledge of availability), and observational learning (parental influences) on

behavioral capability (knowledge and skill to eat healthy and be physically active) as students transition to the college environment in the Virgin Islands (Glanz, Rimer, & Lewis, 2002).

Students are at risk for adverse health outcomes in transitioning from high school to college, including inadequate dietary intake and lack of physical activity (Neumark-Sztainer, Larson, Faulkerson, Eisenberg, & Story, 2010). College students in the U.S. Virgin Islands show the same negative outcomes as those in the United States. Race research on the U.S. mainland aggregates people into one group regardless of ethnicity, culture, or religion. Banks and Wallace (2000) reported that because of a family history of heart disease, African American women were encouraged to engage in physical activity. This same study found that African American women's physical activity choices were influenced by cultural values as well as by benefits of, barriers to, and knowledge of physical activity (Banks & Wallace, 2000).

Despite the benefits of physical activity, lack of activity is a problem for college students (Jeffery, 2013). Although college campuses offer opportunities for activity, the percentage of students who engage in physical activity on college campuses is low (Jeffery, 2013). Physical activity declines during the adolescent years, but the basic reason for this decline remains unknown (Kimm et al., 2002). It has also been stated that the decrease in physical activity among adolescents may be responsible for the increased rate of obesity (Kimm et al., 2002). This high prevalence of inactivity contributes to hypertension, diabetes, cancer, and heart disease (Young & Voorhees, 2003). Activity habits during the college years may track into adulthood (McArthur & Raedeke, 2009).

Fruit and vegetable consumption levels in the United States are far below what is recommended (Lorson, Melgar-Quinonez, & Taylor, 2009). The prevalence of physical inactivity is higher in minorities compared to any other subgroups; race differences and how they correlate with physical inactivity among college students have not been entirely studied (McArthur & Raedeke, 2009). Most studies on physical inactivity have focused on children and adults (McArthur & Raedeke, 2009). According to McArthur and Raedeke (2009), little is known about physical activity correlates for Black students and how physical activity correlates differ among the other races. There is a need, then, to identify these race correlates among college students.

The University of the Virgin Islands is a historically Black university that includes students who originate from cultures other than those of the United States. Most college students who attend the University of the Virgin Islands are natives of the Virgin Islands. However, many students travel from the surrounding Caribbean islands to attend the university. Most islanders' traditions involve youth residing with parents even through college and thus eating homemade meals on a regular schedule.

As students transition to college life from other islands, they have limited meal choices offered at the college cafeteria. The new campus environment may limit the availability and frequency of meals, or students' knowledge of meal availability may be limited, leading to changes in behavioral capability (knowledge of skill). In addition, students' ability to learn and maintain behaviors is affected by decreased parental influence or lack of parental influence. Native students also begin to change their eating patterns as they spend most of the day outside their family home. Studying the predictors

of race/ethnicity on diet and physical activity may initiate the development of interventions that are specific to the interests, needs, and demographics of the population of college students in the U.S. Virgin Islands. Most studies in this area have examined White students and physical activity; others have examined adults and children (McArthur & Raedeke, 2009). Little is known about college students who come from racially/ethnically heterogeneous backgrounds and how they differ from White students in the context of social cognitive constructs.

### **Purpose of the Study**

The purpose of this study was to examine the impact of race/ethnicity on dietary and physical activity habits of college students in the U.S. Virgin Islands. Identifying the ability of race/ethnicity to predict dietary and physical activity behavioral capability among this racially heterogeneous college population may assist in the development of effective interventions tailored to the needs, interests, and demographics of the subgroups at the University of the Virgin Islands and the surrounding Caribbean area. These relationships examined in this study took into account cultural influences through examination of parental influences and new situations faced by students as they adapt to college life.

### **Nature of the Study**

For this quantitative correlation study, I examined the relationship between race, diet, and physical activity among college students at the University of the Virgin Islands on the island of St. Thomas. The population chosen was undergraduate college students, who were selected for a nonprobability sample. All undergraduate students were invited

to participate in the study by campus-wide invitation using flyers. The convenience sample was appropriate because a listing of all students at the university was not available for research purposes outside of university official business. Therefore, random sample selection was not possible.

The questions concerned frequency of meal consumption, availability and consumption of fruits and vegetables, parents' and friends' influence on eating, and frequency of physical activity. The students' demographic information was collected. The independent variable was race/ethnicity, and the dependent variables were diet and physical activity, controlling for gender and age, environment, situation, and observational learning. *Race*, defined as the ethnic or racial group that the student identified with, was the independent variable. *Dietary habits* were defined as the availability and the consumption of at least three to five fruits and vegetables daily (CDC, 2010a), the frequency of meal consumption, and parental influence on eating (EAT Survey II). *Physical activity* was defined as the performance of at least 30 minutes of exercise daily or 60 minutes of exercise three times a week (CDC, 2010f) and how many hours in a week strenuous, moderate, and mild exercises were performed (EAT Survey II). The control variables were gender and age of the students. More detail is provided in Chapter 3.

### **Research Questions and Hypotheses**

Three research questions and seven hypotheses were derived from the literature review in the area of diet and physical activity and the constructs of the social cognitive model. Only the two questions on diet measured observational learning or parental

influences. The racial/ethnic groups that were examined in the study included White, Black or African American, Hispanic or Latino, Asian American, Hawaiian or Pacific Islander, American Indian or Native American, Virgin Islander, and Caribbean West Indian. Differences included physical activity and eating habits. Based on current statistics on obesity by race in the U.S. Virgin Islands, students from Hispanic and Black/African American groups were expected to be less likely to engage in healthier behaviors, controlling for theoretical constructs.

#### Research Question 1

To what extent does race/ethnicity modify the behaviors of weekly frequency of eating meals among college students in the United States Virgin Islands?

Hypotheses 1<sub>O</sub>: There is no relationship between race and weekly frequency of eating meals among college students in the United States Virgin Islands

Hypotheses 1<sub>A</sub>: There is a relationship between race/ethnicity and weekly frequency of eating meals among students in the United States Virgin Islands.

#### **Research Question 2**

What is the correlation between race and parental influence on consumption of meals?

Hypotheses 2<sub>O</sub>: There are relationships between race/ethnicity and parental influences of consumption of meals.

Hypotheses 2<sub>A</sub>: There are no relationships between race/ethnicity and parental influences of meal consumption.

**Research Question 3**

To what extent does race/ethnicity influence physical activity among college students in the US Virgin Islands?

Hypothesis 3<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Strenuous Physical Activity per Week

Hypothesis 3<sub>A</sub>: There are relationships between Race/ethnicity and amount of Strenuous Physical Activity per Week

Hypothesis 4<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Moderate physical activity per week

Hypothesis 4<sub>A</sub>: There are relationship between Race/ethnicity and amount of Moderate physical activity per week

Hypothesis 5<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Mild physical activity per week

Hypothesis 5<sub>A</sub>: There are relationships between Race/ethnicity and amount of Mild physical activity per week

**Theoretical Base: Social Cognitive Theory**

Social cognitive theory is important to health education and health behavior because it addresses the relationship of cognitive, emotional, and behavioral understanding to behavior change (Glanz, Rimer, & Lewis, 2002). The theory has been used by health educators to develop interventions, procedures, and methods to increase the chances of a change in behavior (Glanz, Rimer, & Lewis, 2002). The constructs identified by the theory suggest important opportunities for new behavioral research and

practice in health education (Glanz et al., 2002). The theory was important to this study because it addresses cognitive, emotional, and other aspects of behavior that affect behavior change among college students in the U.S. Virgin Islands. Social cognitive theory has several key concepts: environment, situation, behavioral capability, expectancies, self-control, observational learning, reinforcements, self-efficacy, emotional responses, and reciprocal determinism (Glanz et al., 2002).

*Environment* is the factor that is external to the person (Glanz et al., 2002).

Environment includes family, friends, peers, and availability of food. *Situation* refers to the person's opinion of the location (Glanz et al., 2002). Situation involves the place, time, activity, participants, and individual's role. The atmosphere and location provide a biological outline for understanding behavior—why some groups are at risk for not performing health behaviors such as physical activity and consumption of fruits and vegetables (Glanz et al., 2002).

*Observational learning*, another concept of social cognitive theory, is the behavioral achievement that occurs by observing the actions and outcomes of others (Glanz et al., 2002). If the students in the study learned their behaviors from observing their families, then the hypotheses would prove to be true. The college campus represented the environment where the students lived. A new environment can influence individuals' perception of the situation and determine whether students change their behavior. This may explain why people in the same family have the same behavioral patterns but react differently when away from the setting where they learned the behavior. Children observe their parents when they eat, drink, smoke, and exercise.



However, behaviors can be thought but not practiced because of other factors in the person's environment.

*Behavioral capability* is another concept referring an individual's information on and ability to perform a certain behavior. *Expectation* is the expected outcome of a behavior (Glanz, Rimer, & Lewis, 2002). *Reinforcements*, another construct, are the responses to an individual's behavior that increase or decrease the repetition of the event, and *self-control* is how confident a person feels in completing a task and overcoming barriers in doing so (Glanz, Rimer, & Lewis, 2002). *Emotional coping responses* are techniques used by the individual to overcome emotional stimuli, which provide training in problem solving and stress management (Glanz, Rimer, & Lewis, 2002). According to Glanz, Rimer, and Lewis (2002), *reciprocal determinism* involves the interaction between where a behavior was performed, the person, the behavior, and the environment.

Social cognitive theory was chosen for this study because it is relevant to health education and to personal, environmental, and behavioral factors that are related to health behaviors. According to Glanz, Rimer, and Lewis (2002), the theory summarizes disparate cognitive, emotional, and behavioral understandings of behavior changes. The concepts and processes identified by this theory indicate important opportunities for new behavioral research and practice in health education. Focus groups have revealed that children are not eating fruits and vegetables because of environmental, personal, and behavioral factors (Glanz, Rimer, & Lewis, 2002). In terms of this study, environmental factors could suggest that fruits and vegetables are not available in homes or may be insufficient in the college cafeteria. In terms of personal factors, college students could

have been taught not to eat an adequate amount of fruits and vegetables or might not like the taste of certain vegetables and choose not to eat them. Behavioral factors suggest that because college students are mostly responsible for choosing their own meals, they might not have the recipes for making certain dishes and may not have the skill and knowledge to choose healthy meals. Examples of how the constructs were used in the study are shown in Table 1.

Table 1

*Social Cognitive Constructs and Corresponding Study Measures*

Social cognitive constructs	How constructs can be used	Survey questions relating to constructs
Environment (as it relates to diet)	Availability of fruits/vegetables on college campus or at place of residence	<b>22. How often are the following true?</b> a. Fruits and vegetables are available where I live b. Vegetables are served at dinner where I live c. We have “junk food” where I live d. Fruit juice is available where I live e. Milk is served at meals where I live f. Potato chips or other salty snacks are available where I live g. Chocolate or other candy is available where I live h. Soda pop is available where I live
Situation (as it relates to diet)	Students’ knowledge of availability of fruits/vegetables at college cafeteria/ place of residence	
Environment (as it relates to physical activity)	How often does the student visit gyms or attend fitness classes available on college campus or near place of residence	32-34. How often you perform mild, moderate, or strenuous physical activity? none less than ½ hour a week ½-2 hours a week 2½-4 hours a week 4½-6 hours a week 6+ hours a week
Behavioral capability (as it relates to diet)	Do the students have the knowledge and skill to eat healthy foods at the college cafeteria or at place of residence	<b>17. During the past 12 months, about how often have you</b> <b><i>Never; 1-2 times past year; 4-5 times past year; Monthly; Weekly; Daily</i></b> a. bought fresh vegetables at the grocery store? b. written a grocery list before shopping? c. prepared a green salad? d. prepared a dinner with chicken or fish or vegetables? e. prepared an entire dinner for 2 or more people?
Observational learning (as it relates to diet and physical activity)	Do the students’ parents and friends care about their diet and physical activity habits	<b>27. My mother...</b> <b>28. My father ...</b> <b>29. Many of my friends ...</b> <b><i>Not at all A little Somewhat Very much</i></b> a. cares about eating healthy food b. cares about staying fit and exercising c. diets to lose weight or keep from gaining weight d. encourages me to eat healthy foods e. encourages me to be physically active f. encourages me to diet to control my weight

*Note.* The questions in the table were adapted from the EAT Survey II. See Appendix F. Permission was granted by researchers of the EAT Project II to use the questions from

the Eat Survey II. Adapted from Project EAT (Eating Among Teens), by the University of Minnesota, 2011, retrieved from <http://www.sph.umn.edu/epi/research/eat/index.asp>

### **Definition of Terms**

*Obesity:* Defined as an amount of body fat that is not normal in relation to body size (Purnell, 2005). According to the CDC (2010g), an individual with a BMI between 25 and 29.9 is considered overweight, and an obese individual has a BMI of 30 or greater.

*Diet:* The consumption of at least three to five servings of fruits and vegetables daily (CDC, 2010g); how many days eating breakfast, lunch, and dinner; how many times per week eating from a fast food restaurant; the availability of fruits and vegetables, and if served, dinner and junk food available at place of residence; and parents' influence on meals (EAT Survey II).

*Physical activity:* The performance of exercise for at least 30 minutes daily, or 60 minutes three times daily (CDC, 2010f), and how many hours in a week strenuous, moderate, and mild exercises are performed (EAT Survey II).

*Environment:* Factors physically external to a person (Glanz, Rimer, & Lewis, 2002).

*Situation:* Person's perception of the environment (Glanz, Rimer, & Lewis, 2002).

*Observational learning:* Behaviors that occur by watching the actions and outcomes of other behaviors (Glanz, Rimer, & Lewis, 2002).

*Behavioral capability:* The information and ability that an individual has to perform a given behavior (Glanz, Rimer, & Lewis, 2002).

## **Variables in Study**

Race/ethnicity was the independent variable, and the dependent variables were diet and physical activity. *Race/ethnicity* was defined as what the college students perceived as their ethnic affiliation. Race/ethnicity was defined in the following categories: White, Black or African American, Hispanic or Latino, Asian American, Hawaiian or Pacific Islander, American Indian or Native American, Virgin Islander, and Caribbean West Indian.

*Environment* is a factor that is external to a person. It includes family, friends, peers, and availability of foods (Glanz et al., 2002). The study addressed how race influences students' diet and physical activity behaviors. If family and friends influenced the students' behaviors, then the study hypothesis would prove to be true. *Situation*, another construct, is the person's opinion of the atmosphere (Glanz, Rimer, & Lewis, 2002). Situation refers to the place, time, activity, participants, and individual's role.

*Observational learning* is the behavioral achievement that occurs by observing the actions of others and the results of others' behaviors (Glanz, Rimer, & Lewis, 2002). If the students in the given study learned behaviors from their families, the hypothesis predicted that, controlling for parental influence, race/ethnicity would predict behavioral capability, as the students would not be influenced by the new environment or situation in the college. Children observe their parents when they eat, drink, smoke, and exercise. However, a behavior can be thought but not practiced because of another factor in the person's environment.

*Health behaviors* are behaviors undertaken by individuals for the purpose of preventing a disease. Physical activity and dietary habits are health behaviors. *Physical activity* is defined as exercises that are performed daily for at least 30 minutes or for 60 minutes three times weekly (CDC, 2011). *Diet*, for the purpose of this study, is defined as eating at least three to five fruits and vegetables daily, frequency of meals, and parents' influences on eating.

### **Limitations**

The study was conducted on the St. Thomas campus of the University of the Virgin Islands. The university consists of two campuses: one on St. Thomas and the other on St. Croix. It is costly to travel to the other campus, and as a result, the population may not be representative of the entire university's student population. The results were only applied to the Island of St. Thomas, but the recommendations were applied to the entire university. The study used a convenience sample, so the results might not be generalizable. As the study was correlational in nature, the results were not generalized to the St. Croix campus. The study was based on primary data collected from students and took into account students' influences on each other. However, the responses gave me an idea of the students' health behaviors based on the influence of ethnicity.

### **Assumptions**

The students were asked to recall information and self-report the information in the study. It was assumed that students were able to recall information, that they provided accurate information, and that they were honest with their answers.

### **Delimitations**

The study addressed the effect race had on dietary and physical activity habits among students on the St. Thomas campus of the University of the Virgin Islands. Only the racial/ethnic groups of the students represented at the university were examined. Only undergraduate college students were included in the study. The sample was recruited through campus-wide invitations to students using flyers. The beginning of the survey was based on IRB approval and my availability to distribute and collect surveys from locked boxes put in places where students gathered on the campus.

### **Significance of the Study**

A gap in the literature concerning factors that affect students' diet and physical activity behaviors was addressed. This was especially important because no other studies were found about college students in the Virgin Islands. Understanding the physical activity and diet of college students from a health promotion perspective and how race influences choices in these areas was important because physical activity decreases with age, with the sharpest decline occurring with college students (McArthur & Raedeke, 2009). Understanding the relationship among race, diet, and physical activity among college students in the Virgin Islands may help in developing effective programs that are tailored for each race. Identifying diet and physical activity correlates may help in the development of specific health promotion programs and interventions tailored to the needs, interests, and demographics of college students in the Virgin Islands. The increase in obesity and individuals' increased risks for diabetes, cancer, heart disease, and stroke constitute a major public health concern that is likely to improve if programs are tailored

to racial/ethnic groups to address the specific needs of these groups. Administrators, policy makers, and health educators may become aware of these specific correlates and change or develop health education and promotion programs to educate the general public. Parents may be able to improve their own health behaviors to positively influence the health behaviors of their children. Positive health behaviors among students may reduce the prevalence of obesity. Little or nothing is known about how race influences diet and physical activity among college students in the United States Virgin Islands, where the population is made up of racially and ethnically heterogeneous groups.

The study focused on race/ethnicity, diet, and physical activity as behavioral capability. Other variables in the instrument were sex, age, residential area inhabited in the past year, and with whom the student lived within the past year. These variables helped in determining whether race/ethnicity influences physical activity and diet alone, or whether these factors also played a role. This study not only adds to the literature on college students' diet and physical activity, but also adds to the knowledge about college students in the U.S. Virgin Islands. This information may be used to develop programs and interventions specifically for certain groups. College students were made aware of the results and should be able to make healthy food choices, become more physically active, and reduce their risk factors for obesity. College students became aware of their own personal choices and how their race can influence their health behavior choices. They should be able to change their behaviors and educate their families and friends based on the data from this study. The data can be used by health professionals, local governments, policy makers, and educators to develop programs and interventions



designed to influence healthy diet and physical activity choices based on ethnicity. The results can be shared with other public health professionals, program developers and policy developers in other Caribbean islands as well as the United States for the development of interventions designed to address this issue through peer-reviewed publications, executive summaries, and articles in the local newspaper.

### **Summary and Transition**

The environment that college students face is challenging and can contribute to physical inactivity and reduced fruit and vegetable intake. This may lead to weight gain and increased risk of chronic diseases. The purpose of the study was to examine the relationship among race, diet, and physical activity among the college population in the U.S. Virgin Islands. The study was conducted in an attempt to determine whether there is an association among race, diet, and physical activity among college students and the extent to which the relationship exists. The literature review is presented in Chapter 2.

## Chapter 2: Literature Review

### **Introduction**

The purpose of this quantitative study was to examine the role of racial diversity in dietary and physical activity habits. According to Ajibade (2011), the increase in prevalence of obesity has become a concern for the health of American youth. Exploration of the correlates of physical activity and diet with obesity can create the knowledge that educators and policy makers need to create interventions that reduce the risk of obesity. Although this relationship has been established, the rise in obesity has continued, and more research is needed to determine different factors related to obesity (Ajibade, 2011). This literature review was focused on the association between race, diet, and physical activity among college students. Race also influenced other factors among students, which are mentioned in the review. The study's methodology, theoretical constructs, and key variables are presented in the rest of the chapter.

### **Literature Search Strategy**

The matrix method was used to review the literature (Garrard, 2007). The matrix method is a means of organization and a manner of reviewing the literature (Garrard, 2007). The process included creating a paper trail to keep track of where the search had been conducted to find materials important to the study. The next step was organizing the documents for review, and then the review matrix step included extracting information from the documents, followed by writing of the review of the literature. A table was used containing notes to identify relevant articles.

I conducted an extensive search of the literature before writing Chapter 2, using key words such as *diet, physical activity, foods, ethnicity, race, social cognitive theory, obesity, and college students*. Article abstracts were read and printed to search for full articles. A full-article search was conducted using databases such as *Medline, Sage, CINAL Plus, and ProQuest*. Keys words included *college students, physical activity, obesity, social cognitive theory, and ethnicity*. The articles collected were printed and gathered for review. The printed articles were stored in a file folder. During the reading process, the articles were noted for research method, population sample, types of study, significance to the problem, and relevance to the current study. Data were collected from the articles and saved for future reference. The references were typed and saved as the articles were read. The studies were collected from peer-reviewed journals, articles, and government-reviewed websites.

### **Epidemiology of Obesity Risk Factors**

According to the CDC (2011a), obesity is excess body fat that occurs when individuals consume more calories than what their bodies need and engage in a sedentary lifestyle. Factors that contribute to body weight are genes, metabolism, behavior, culture, and economic status (CDC, 2010a). Behavior and environment play a role in making individuals obese (CDC, 2010a). Obesity rates in the United States have increased to the point where obesity has been an epidemic for the past 30 years (CDC, 2009). According to the CDC (2009), two-thirds of American adults and one-third of children were obese as reported in 2003-2004 data. Obesity prevalence doubled among adults from 1980 to 2004, and it has been estimated that 33% are overweight, 34% are obese, and 6% are

extremely obese (CDC, 2009). The CDC (2009) has stated that obesity increases an individual's risk of many chronic diseases, which include diabetes, stroke, heart attack, some cancers, and heart disease. Diet and exercise are key determinants but are not the only factors that play a role in individuals' weight (CDC, 2009). Limited access to fruits and vegetables, high cost of healthy foods, and lack of places to exercise are other factors that contribute to obesity (CDC, 2009).

Obesity has increased in all levels of the population, according to 2007 and 2008 data from the National Health and Nutrition Examination Survey (CDC, 2010a). The relationship between obesity and income varies by ethnicity and race (CDC, 2010a). Obesity prevalence among non-Hispanic Black and Mexican American men decreased when compared to races above 350% of the poverty level to those below 130% of the poverty level; 44% of non-Hispanic Black men with incomes above 350% of the poverty level were obese, compared with 29.9% below 130% of the poverty level (CDC, 2010). Similarly, 40% of Mexican American men with incomes above 350% of the poverty level were obese, compared with 29.9% of those below 130% of the poverty level. On the other hand, according to a 2005-2008 survey, obesity prevalence among women increased as income decreased (CDC, 2010). Twenty-nine percent of women with incomes above 350% of the poverty level were obese, whereas 42% of those below 130% of the poverty level were obese. According to CDC (2010), the trend was similar for non-Hispanic White, non-Hispanic Black, and Mexican American women. Hispanic White women above 350% of the poverty level had 27.5% obesity prevalence.

The relationship between education level and obesity prevalence has not changed among college graduates (CDC, 2010). The obesity prevalence among men with a college degree was 24.4%, compared to 32.1% among men without a high school diploma (CDC, 2010). Obesity prevalence among women with a college degree was 15% to 23%, compared to 31% for women with a high school diploma. According to the CDC (2012), less educated women are at greater risk for obesity than those with college degrees. The obesity prevalence shows no significant differences by education among ethnic groups, according to CDC.

The overall obesity prevalence in the United States based on self-report was 36% for non-Hispanic Blacks, 30% for Hispanics, and 17% for children 2 to 19 years (CDC, 2010). In 2007, no state in the United States was able to meet the Healthy People 2010 objective to reduce obesity by 15%. According to CDC (2010), there were significant racial and ethnic differences in the prevalence of obesity in the United States among children and adolescents. Obesity was more prevalent among Hispanic boy's ages 2 to 19 years than among non-Hispanic White boys. Obesity among non-Hispanic Black girls was greater than obesity in Hispanic girls (CDC, 2009). Lack of physical activity and sedentary lifestyles can cause individuals to become overweight. College students are at risk for obesity because they are within the age range for the increase in obesity in the United States. College students' eating styles and lack of physical activity can place them at risk for obesity. Increased physical activity helps to eliminate health disparities among college students (Lee, 2005). According to Lee (2005), surveillance data for people ages 18-65 indicate that there is a decline in physical activity, especially by race and ethnicity.

For example, a greater percentage of White and non-Hispanic adults are meeting physical activity recommendations compared to African Americans (Lee, 2005). This pattern holds true for adolescents in Grades 9 through 12 as well (Lee, 2005).

Many students engage in risky behaviors such as alcohol use, tobacco use, physical inactivity, and unhealthy dietary practices during the college years. Factors that influence unhealthy behaviors in college students need further investigation (Ebert, Ngamviroj, Park, & Kang, 2004). This study identified the relationship among race, diet, and physical activity among college students.

Smith (2011) stated that the rate of obesity in adults has doubled and that the rate of childhood obesity has tripled over the years. There has been a link between obesity and an increase in hypertension, prediabetes, heart disease, arthritis, and some types of cancers (Smith, 2011). The correlation between obesity and other chronic diseases has resulted in an annual cost of more than \$60 billion (Smith, 2011). Increases in daily caloric intake, portion sizes of foods, eating out, and sedentary lifestyles; decreased access to healthy foods; family and cultural values, and marketing of unhealthy foods have all contributed to the obesity epidemic (Smith, 2011).

Flegar, Carroll, and Odgen (2010) conducted a study to compare the patterns of obesity from 1999 to 2008 to the patterns of obesity from 2007 to 2008. Data on height and weight were taken from 5,555 adult men and women ages 20 and older in the National Health and Nutritional Examination Survey (NHANES). The results collected in NHANES from 2007 to 2008 were compared with results for 1999 to 2006 (Flegar, Carroll, & Odgen, 2010). The obesity rate surpassed 30% in most age groups in the

United States. Prevalence ranged from 31% among non-Hispanic White men to 37% in non-Hispanic Black men; in women, the age-adjusted prevalence was 33% in non-Hispanic Whites and 49.6% in non-Hispanic Blacks (Flegar, Carroll, & Odgen, 2010). The authors commented that high death rates from obesity are the result of cardiovascular disease, diabetes, and certain cancers. According to Flegar, Carroll, and Odgen (2010), obesity is closely linked to diabetes, and the increased prevalence of this condition around the world is a major concern. Diabetes rates increased greatly among non-Hispanic Blacks and in the population in general from 1988 to 2006. Racial groups have been affected by obesity in different ways. For example, obesity rates among non-Hispanic Black and Mexican American men with higher incomes are higher than obesity rates among lower income men (CDC, 2012). Obesity prevalence also varies across states and regions (CDC, 2012). According to the CDC (2012), in 2011, the obesity rate in Colorado was 20.7%, whereas it was 34.9% in Mississippi. The rate of obesity was more than 20% in all U.S. states. The states that had an obesity prevalence of 30% and above were Alabama, Arkansas, Indiana, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, South Carolina, Texas, and West Virginia (CDC, 2012). There were 39 states with obesity prevalence of 25% and above. Despite numerous media campaigns about the causes and prevention of obesity, the rate of obesity has continued to increase. Data on ethnic minority populations show a relationship between physical activities and race (Brownson et al., 2000). The Virgin Islands population has a different racial composition than the population of the United States as a whole.

Maintaining a healthy, physically active lifestyle significantly reduces the risk of several leading causes of mortality (Yaynor & Jankowiak, 2010). A decrease in physical activity has contributed to the obesity epidemic that has affected all age groups in the United States and across the world (Yaynor & Jankowiak, 2010). A physically inactive lifestyle that develops during the college years may continue throughout the lifespan (Yaynor & Jankowiak, 2010). Yaynor and Jankowiak (2010) and Jeffrey (2013) stated that physical activity increases as young adults enter college.

An individual's nutrition is vital in maintaining optimal health and preventing chronic diseases (Stephens, 2011). Consuming the recommended five servings of fruits and vegetables daily is significant for reducing chronic disease risk (Stephens, 2011). Promoting healthy eating behaviors among adolescents is important, as this can promote long-term healthy behaviors (Larson, Neumark-Sztainer, Story, van den berg, & Hannan, 2011). Unhealthy eating habits are not only confined to United States youth. An Australian study indicated that only 5% of adolescents' ages 14 to 16 years met the Australian Guide to healthy eating recommendations for vegetables, and 1% met the recommendation for eating fruits, according to the Australian National Children's Nutrition and Physical Activity Survey (Stephens, McNaughton, Crawford, MacFarlane, & Ball, 2011). Project EAT I and Project EAT II showed a decline in fruit and vegetable consumption during the transition from early to mid-adolescence (Larson et al., 2011). A better understanding of what influences adolescents' nutritional intake is needed (Stephens, McNaughton, Crawford, MacFarlane & Ball, 2011).



### **Social Cognitive Theory and Health Behavior**

Social cognitive theory may be applied to the examination of psychosocial dynamics affecting health behavior and ways of promoting behavioral change (Glanz, Rimer, & Lewis, 2002). According to Glanz, Rimer, and Lewis (2002), human behavior may be described in a model in which there is an interaction among behavior; personal factors, including cognitions; and environmental influences. “Among the personal factors are the individual’s capabilities to symbolize, to anticipate the outcomes of behavior, to learn by observing others, to have confidence in performing behavior, to self-regulate a behavior, and to reflect on and analyze experience” (Glanz, Rimer, & Lewis, 2002, p. 165). Social cognitive theory has been used by health educators to implement procedures and techniques to increase the chance of positive behavior change (Glanz, Rimer, & Lewis, 2002). The theory involves several concepts: “environment, situation, behavioral capability, expectations, expectancies, self-control, observational learning, reinforcements, self-efficacy, emotional coping responses and reciprocal determinism” (Glanz, Rimer, & Lewis, 2002).

*Environment* consists of factors that are outside the person (Glanz, Rimer, & Lewis, 2002). They include family, friends, peers, and availability of foods. *Situation*, another construct, is the person’s opinion of the atmosphere (Glanz, Rimer, & Lewis, 2002). *Observational learning* involves achieving a positive behavior by observing the actions and outcomes of others’ behaviors (Glanz, Rimer, & Lewis, 2002). The knowledge and the ability to perform a given behavior are termed *behavioral capability*; *expectation* is the expected outcome of a behavior (Glanz, Rimer, & Lewis, 2002). The

manner in which a person responds to a given behavior, which increases or decreases its recurrence, is termed *reinforcement*, and *self-control* is the assurance a person senses about performing a particular activity in conquering the barriers to performing the behavior (Glanz, Rimer, & Lewis, 2002). *Self-efficacy* is the confidence the person has in performing the behavior and in overcoming the barriers to performing the behavior (Glanz, Rimer, & Lewis, 2002). According to Glanz, Rimer, and Lewis (2002), *emotional coping responses* are methods that are used by a person to manage stress. *Reciprocal determinism* involves communication among the person, the behavior, and the environment in which the behavior is performed (Glanz, Rimer, & Lewis, 2002). The principles that the individual places on a given outcome are defined as *expectancies* (Glanz, Rimer, & Lewis, 2002).

Social cognitive theory was chosen for this study because it is relevant to health education. According to Glanz, Rimer, and Lewis (2002), the theory summarizes disparate cognitive, emotional, and behavioral understandings of behavior changes. The concepts and processes identified by this theory indicate important opportunities for new behavioral research and practice in health education (Glanz, Rimer, & Lewis, 2002). The study's implications for positive social change may include informing the design of culture-specific interventions that address dietary intake and physical activity for racially heterogeneous populations. This study addresses racial diversity as a sociocultural and not a biological factor, which may have more benefit in understanding perceptions of risk factors in mainland populations and developing more accurate health promotion

interventions. The remainder of this section describes several studies on the application of social cognitive theory.

Lubans et al., (2011) use the theory to examine and evaluate a social cognitive model of physical activity in adolescent girls. The authors concluded that the model provides suppleness in regard to which scales are included and includes a range of programs and interventions for adolescent girls. Plotnikoff, Costigan, Karunamumi, and Lubans (2013) examined the use of social cognitive theory to explain physical activity behaviors in adolescents. They concluded that the majority of physical activity difference remains unexplained and that more research needs to be conducted. Anderson, Winett, and Wojcik (2007) examined how the theory accounts for the nutritional content of food purchases and consumption among adults. The authors concluded that social cognitive theory suggests that self-efficacy is the greatest determinant of nutrition behavior in relation to regulating food intake and purchases.

Neumark-Sztainer, Eisenberg, Fulkerson, Story, and Larson (2008) examined a 5-year longitudinal association between family meal frequency and disordered eating in adolescents. Adolescents from 31 Minnesota schools completed the EAT Survey. The authors hypothesized that girls experienced fewer disordered eating behaviors than boys with frequent family meals. The results indicated that regular family eating among adolescent girls was associated with less time to develop extreme weight-control behaviors; however, family meals for adolescent boys did not predict lower levels of disordered eating (Neumark-Sztainer et al., 2008). This study suggested that it is important that families to explore ways to increase the frequency of family meals. This

study is relevant because it examined whether race/ethnicity influences diet and physical activity among college students in the Virgin Islands. The present study included information about the location of meals (campus, family home, etc.) and perceived family influence on healthy eating and participation in physical activity. Neumark-Sztainer et al. (2008) suggested that spending time with family can have an effect on eating, which may have an impact on college students' eating behaviors. One key construct of social cognitive theory is observational learning. If adolescents observe the preparation of meals in their families, this experience might influence their eating behaviors. The study discussed above suggests that family plays some role in disordered eating in the United States (Neumark-Sztainer et al.).

Neumark-Sztainer et al. (2008) provided an overview of the use of the EAT Project and the integration of social cognitive theory. Their purpose was to provide a combined outline of the method and important results from years of research on family meals as part of Project EAT. Focus groups were conducted with 141 middle and high school adolescents (Neumark-Sztainer et al., 2008). Questions on the significance of family meals positively impacting health behaviors were answered in addition to parents being interviewed. The findings indicated that many adolescents and parents still believe that family meals are important, but there are differences in the context of occurrence and pattern of family meals in homes (Neumark-Sztainer et al., 2008). Recommendations were made for further research on family meals and health outcomes. The overview suggests that family meals influence adolescent food outcome choices in the United

States. This study was of a different culture and involved examining the relationship between the variables, if any.

Arcan et al., (2007) examined parents' report of food availability in homes and the association to parents' intake with adolescents' intake of the same food. A racially diverse sample of adolescents were studied longitudinal from 1999-2004. Parents and students were studied using interviews, and completing surveys, and associations were examined individually for high school and young adults and for males and females (Arcan et al., 2007). Twenty-eight percent of males, and 38% of females consumed fewer than three servings a day; the students were examined as young adults a few years later and the finding suggested that the intake of fruits and vegetables were even lower than the first time and the parents' intake closely resembled that of their children (Arcan et al., 2007). This suggests that children learn from observing their parents.

How parents support impacted their children's ability to be physically active and their concerns associated with adolescent physical activity and sedentary behaviors five years later was longitudinally studied (Bauer, Nelson, Boutelle, & Neumark-Sztainer, 2008). Adolescents and young adults were surveyed and were asked if their parents encouraged them to stay physically active and were concerned about their staying fit. Their physical activity and sedentary lifestyles were assessed using linear regression models. The results indicated adolescents' habits were predicted by parental encouragement; males and females were influenced differently by both parents (Bauer, Nelson, Boutelle, & Neumark-Sztainer, 2008). The authors concluded that parents should continue to encourage their children to perform physical activity, but more research was

needed to examine more ways for parents to encourage their children. Reinforcements are another concept of the social cognitive theory and in this study, where parents reinforced and encouraged their children, the behavior remained positive.

Plotnikoff, Costigan, Karunamuni, and Lubans (2013) systematically reviewed and examined the social cognitive theory to explain physical activity purpose and behavior among adolescents. The social cognitive theory proposed that behavior is changed by social and emotional determinants (Plotnikoff, Costigan, Karunamuni, & Lubans, 2013). The authors stated that the theory was important in guiding intervention and foster positive behavior change. The authors concluded that further studies that employed low risk method biases were needed because the evidence which surrounded the social cognitive theory for describing adolescent populations' physical activity was limited (Plotnikoff, Costigan, Karunamuni, & Lubans, 2013).

### **Fruit and Vegetable Consumption**

Consumption of vegetables and fruits differed among ethnic and racial groups, according to the CDC (2010). The data were analyzed from self-reported data using the BRFSS for 2005. The occurrence of fruits and vegetables was greater in men in other ethnic groups (16.5%) compared to non-Hispanic White men at 12.6%, non-Hispanic Black women engaged in these two activities when compared to 14.8% Hispanic women and 17.4% of non-Hispanic White women (CDC, 2010). The results of the prevalence of eating fruits and vegetables five or more times per day were higher in men than women (CDC, 2010). In non-Hispanic Whites the overall prevalence was 12.6%, Black non-Hispanic reported 11.2% who ate five or more fruits and vegetables per day, Hispanics

reported 11.7%, American Indian was 17.5%, Asian Pacific Islander reported 10.5%, and the other multiracial reported 16.5% prevalence (CDC, 2010). The survey asked individuals to complete a digital phone survey using a multiple probability sampling plan using a diverse sample. According to the report, the results indicated a need to encourage a diet high in vegetables and fruits, and physical activity should be encouraged among all populations especially among racial and ethnic minorities (CDC, 2010). This data showed the difference in fruits and vegetable consumption among the different ethnic population. This suggested that race may have an influence on what individuals eat, and may influence college students' nutritional intake. College students may eat unhealthy because of their schedules and the freedom of choice they have to eat at home, but the data above showed ethnic differences in consumption which may have an influence on college students' diet.

The Youth Physical Activity and Nutrition survey was designed, and distributed to middle schools in Florida (Zapata, Bryant, Mcdermott, & Hefelinger, 2008). The study's purpose was to collect data on physical activity, nutrition knowledge, and health practices among middle school students (Zapata, Bryant, Mcdermott, & Hefelinger, 2008). The sample was 4,452 students with data collected in spring 2003. The students were between 12 to 14 years old and the sample was representative with respect to age, grade level, race, and ethnicity. The results indicated only 22.8% consumed five or more fruits and vegetables daily; important differences were seen in grade level and ethnicity, however no sex differences were found (Zapata, Bryant, Mcdermott, & Hefelinger, 2008). Non-Hispanic Blacks reported 29.9% consumption, and non-Hispanic Whites

consumed 20%. The result for eating breakfast was significant for grade level, sex, and ethnicity. For physical activity, there were a significant difference in ethnicity with non-Hispanic Black youth at 11% who did not engage in any physical activity and non-Hispanic White youth totaled 5% (Zapata, Bryant, Mcdermott, & Hefelinger, 2008). The authors concluded that these findings only indicated that the obesity epidemic will continue and that girls and Hispanic youth should be the focus of physical activity intervention. This study found no relationship in eating fruits and vegetables among gender as compared to the CDC (2010) data that showed men ate more fruits and vegetables than women. This showed some differences in gender for consumption of fruits and vegetables. This study hypothesized that race may be that factor.

Factors such as race, age, education, income, and gender have been found to affect food choices (Kuchler & Lin, 2002). In a study conducted on the Diet and Health Knowledge survey, Westenhefer (2005) reported that age and gender do impact food choices. The data from the CDC (2011) confirmed this finding that men and women differed in fruit and vegetable consumption. However, Westenhefer (2005) indicated that health beliefs may be responsible for these choices whereas the CDC, (2011) did not identify the factors responsible for the difference.

Aruguete, DeBord, Yates and Edman (2005) conducted a study and examined ethnic and gender variances in eating patterns among college students. A sample of 424 was studied from a Midwestern historically black university. The students self-reported their ethnicity as Black, White, Multiethnic, and Other (Aruguete, DeBord, Yates & Edman, 2005). The purpose of the study was to examine what predicted eating disorders



in Black and White students from a historically black university (Aruguete, DeBord, Yates & Edman, 2005). The students voluntarily completed a survey during class time for two semesters; demographic information were collected and assessed for gender, age, weight, height, ethnicity, diet, body mass, and exercise (Aruguete, DeBord, Yates & Edman, 2005).

The results of the BMI indicated that there was a significant effect of ethnicity for age where the Black participants were younger than the White participants; there was no significance in age for gender (Aruguete, DeBord, Yates & Edman, 2005). The study included age as a covariate to control the effect of age on ethnicity; group differences were analyzed using the 2-way gender x ethnicity ANCOVA (Aruguete, DeBord, Yates & Edman, 2005). The study concluded that Blacks had a higher BMI than Whites and the BMI had a significant effect on ethnicity. Ethnicity had an effect on body dissatisfaction, self-loathing, and dieting (Aruguete, DeBord, Yates & Edman, 2005). This study suggested that race may have an influence on college students in the United States. This may indicate that if race played a role in the students' diet in the United States, then it may play a role in the Virgin Islands since most of these students reside at home with family before attending college. The college students in this study came from a different geographic location which may or may not have the same influences as those in the United States. This study examined how race influenced diet and physical activity choices among college students in the US Virgin Islands.

Franko et al., (2008) conducted an experimental study to demonstrate increase nutrition behaviors after exposure to an online nutrition program. Undergraduates from

six universities, a total of 606 participants, ages 18 to 24 years participated in the study; students were randomized to be in the controlled group and in the experimental group (Franko et al., 2008). Students signed the consent form and the online program was completed in a computer lab. Fifty-eight percent of the sample was non-Hispanic White, 14% non-Hispanic Black, 15% Hispanic, 6% Asian and 7% of the sample was of unknown origin (Franko et al., 2008). There were no differences in the initial analysis in the study sample from the six universities (Franko et al., 2008). The results showed that there was an increase in fruit and vegetables consumption, a positive increase in motivation to change dietary behaviors, and an increase in knowledge in the experimental group (Franko et al., 2008). The students showed potential to increase their health behavior after being exposed to a nutrition program. If students were influenced at an early age to healthy behaviors by their families, they may carry this behavior throughout their life. Individuals practice what they are taught, so race may influence what is portrayed.

### **Physical Activity**

Healthy People 2010 suggested that participation in physical activity regularly is one factor that maintains a healthy society. However, the design of the working and living environments has reduced the demands for physical activity (Keating, Jianmin, Pinero, & Bridges, 2005). Sedentary lifestyles have produced overweight individuals and an increased risk for poor health (Keating, Jianmin, Pinero, & Bridges, 2005). More college students have adapted sedentary lifestyles than ever before, and this increases their risks of poor health (Keating, Jianmin, Pinero, & Bridges, 2005). There has been a

decline in physical activity among college students' ages 18-24 years (Jeffrey, 2013). The American College Health Association reported that only 19% of college students indicated participating in modern physical activity (five days or more) and more than one fourth (28%) participated in vigorous physical activity three days or more days (American College Health Association, 2008). These figures are troubling because most adult health behaviors begin during the college years (Jeffrey, 2013). Does race have an impact on these sedentary lifestyles that college students portrays or are these learned behaviors that develop later in life. This study examined the relationship of race and physical activity among college students in the Virgin Islands.

Hala and Ray (2006) investigated motivational factors for physical activity from a sample of 431 undergraduate students in Amman Jordan. All participants were volunteers and completed a survey that asked about age, gender, religion, nationality, year in college, marital status, and physical activity levels. Frequency distribution, factor analysis, and multiple regressions were used to analyze the data. The data collected showed 75% of men and 88% of women were not active for 30 minutes three or more days per week (Hala & Ray, 2006). It was suggested that the high percentage of physically inactive women was influenced by cultural barriers such as gender segregation and skin exposure while wearing sports clothes may have prevented them from participating in physical activity (Hala & Ray, 2006). This study indicated that culture played a role in participating in physical activity for college women in Jordan. Although race may not have affected the male gender, it affected the females. This study although somewhat different in approach agreed with CDC (2010) data that indicated that gender

was significant in fruits and vegetable consumption. The CDC (2010) data however did not indicate that race was a factor but Hala and Ray (2006) stated that culture was a factor.

Jeffrey (2013) found that 47% of college women, 51.8% of men, and 49.4% of the overall college students engaged in 20 or more minutes of vigorous activity three or more days per week. Only 17.6% of women, 13.3% of men, and 15.4% overall of the students participated in 30 minutes or more of moderate activity. Jeffrey (2013) found that 20.4% of women, and 15.8% of men did not engage in any type of physical activity in a study conducted at a private comprehensive institution located in Northeastern United States. A total of 841 undergraduates participated in the study. The participants consisted of 65% Caucasian, African American 14.4%, Hispanic 9.6%, Asians 8.6% and other 2.4% (Jeffrey 2013). Male students participated in more physical activity than females (Jeffrey, 2013). A similar study Hala and Ray (2006) found males to be more involved in physical activity than female college students. Female in the Jeffrey (2013) study were found to be motivated by weight management, appearance, and stress management. The purpose of this study obtained baseline physical activity behaviors, motivation factors, and self-efficacy levels to assist in the development of physical activity interventions for college students.

According to the CDC, MMR report (2005) physical activity is related to individuals increased risk of some chronic diseases which includes cardiovascular disease, diabetes, and osteoporosis. Physical activity has many benefits, however more than half of American adults are not regularly active (CDC, 2005). The Centers for

Disease Control and Prevention analyzed data from the Behavioral Risk Surveillance system (BRFSS) from 1999 to 2004 to determine the prevalence estimated by sex, age, and race/ethnicity for the 50 States and DC. A survey study was done and the data were analyzed using statistical software (CDC, 2005). According to the data collected among racial/ethnic groups for 1994 to 2004, prevalence was lowest among non-Hispanic White men decreasing from 26% to 18.4%. Among non-Hispanic Black men, the prevalence of physical activity was higher (34.2%) and decreased to 27%. Hispanic men had the highest prevalence (37%) and lowest decline (32%) in physical activity over a decade; non-Hispanic Black female 45% to 33%; Hispanic women had the highest but decreased from 44% to 39% when compared to non-Hispanic white women with a prevalence decrease from 28% to 21% (CDC, 2005). However, the overall data for the BRFSS (2009) indicated that the prevalence of physical activity increased in 2005 to 2009 with a 70.8% of individuals reporting that they do not participate in 20 minutes of physical activity at least three days weekly. The data suggested that there was some relationship between race and physical activity among adults. This study hypothesize that there is a relationship between race and physical activity among college students ages 18-23 years. If there is a relationship between the variables for adults, then there might be one as well among young adults.

The data for the United States Virgin Islands have been limited. According to the CDC (2011e) 2003 data for the Virgin Islands, 34.7% of the population showed insufficient physical activity and 25.4% was inactive. In 2005, 37.6% was insufficient for physical activity, and 19.9% was inactive, and in 2007, 38.7% was insufficient and

20.9% was inactive for physical activity (CDC, 2011e). According to State Health Facts (2011) the prevalence of overweight/obesity by ethnicity in the Virgin Islands in 2010 was as follows: 49.7% among White, 67% among Blacks, and 78.6% among Hispanic. The overall obesity rate was 66.2%. Obesity prevalence by gender for the Virgin Islands in 2010 was 67.9% among males and 64.7% among females, and participation in moderate physical activity was 42.7% (State Health Facts, 2011). There were no data on fruits and vegetable consumption.

A study conducted by Eglis, Bland, Melton, and Czech (2011) examined age, gender, and race differences in exercise motivation among college students at a Mid Southern university. The study used a cross sectional, quantitative, design with 2,214 students completing an online survey over fall 2005 and spring 2006. The results indicated that Whites were more likely to exercise for stress management, enjoyment, and weight management, and Blacks were likely to exercise for health pressures, ill health avoidance, and nimbleness (Eglis, Bland, Melton, & Czech, 2011). Limitation of the study included not being able to generalize the sample because of the geographical location. This study suggested that there was a difference among physical activity and race for college students in the United States, and that there were various reasons for participation in physical activity. This study examined race and physical activity among college students in a different geographic location to determine if there was a relationship.

Several studies examined the relationship between race and physical activity among college students. Suminski, Petosa, Utter, and Zhang (2002) reported that Asian,

White, and Hispanics were different in physical activity for both gender and race. Physical activity levels were higher among African American men than African American college students. Suminski, Petosa, Utter and Zhang (2002) found that among women race and BMI were related with physical activity levels where as for men, race and BMI were not related to physical activity.

McArthur and Raedeke (2009) examined race and sex differences on physical activity levels correlates, and the relationship between potential psychosocial correlates and self-reported physical activity. McArthur and Raedeke (2009) found that there were no significant differences on sex or race differences on the importance of physical activity. This study was conducted among 636 college students enrolled in a fitness course between ages 17 to 50 years. It was found that African American exercised less than the other races and had the highest BMI. This study examined race and physical activity for a different population of students when compared to the United States population.

#### **Association between Race/Ethnicity and Diet and Physical Activity**

The studies reviewed examined combinations of variables on fruits, diet, and physical activity. The relationship between race, diet, and physical activity was inconclusive. Some studies indicated that other factors such as age, gender, and environmental factors had an influence on diet and physical activity and concluded that race alone was not a factor that influenced diet and physical activity.

According to Huang et al., (2003) data from the National College Health Risk Behavior survey showed that obesity and overweight among college students is 35%.

Research data that studies college students are limited (Huang, Harris, Lee, Nazir, Born, & Kaur, 2003). Huang et al., (2003) surveyed a sample of 736 college students' ages 18-27 years in spring of 2001 at the University of Kansas. The purpose of the study was to assess overweight, obesity, dietary habits, and physical activity. The students completed a short cross sectional survey questionnaire that was part of a smoking behavior study on diet and physical activity. Consent was obtained prior to completing the study (Huang, Harris, Lee, Nazir, Born, & Kaur, 2003). The researchers used self-reported weight to calculate BMI and used the latest growth chart to calculate BMI percentiles. The Berkely Food and Vegetable Screener was used to assess servings of fruits and vegetables, and questions from the Youth Risk Behavior survey were used to assess physical activity and exercise (Huang, Harris, Lee, Nazir, Born, & Kaur, 2003). The results indicated that 62% of the sample of college students consumed less than five servings of fruits and vegetables daily and male students did more physical activity than female students.

The study concluded that overweight among college students was at a high percentage, and college students were engaging in less than healthy behaviors (Huang, Harris, Lee, Nazir, Born, & Kaur, 2003). Huang et al., (2003) also stated that most college students did not meet the recommended daily intake of fruits and vegetables and that physical activity was low especially among students younger than 20 years of age. The authors suggested implications, were that more research was needed to assess the nature of physical activity and diet among college students, and more clinically controlled studies are needed to assess these factors. This illustrated that college students were influenced by more than just their college environment and their peers. More



research needs to be done on the influence of race, rather than just college environment, and study schedule. Diet and physical activity choices are lifestyles that are learned before coming to college and the college environment should influence a healthy lifestyle not a negative one.

Vella-Zarb and Elgar (2010) conducted a study to explore how students gain weight in their first year of university and to determine what environmental or psychological factors predicted weight gain. First year students at the University of Carleton in Ottawa, Canada were recruited to take part in the study through online participation and announcement in the first year classes (Vella-Zarb & Elgar, 2010). One hundred and twelve students participated were weighed and completed questionnaires in their first year. The results indicated that weight gain was slight but was significant to on campus resident students who gained more than commuter students. There was a relationship between environment accommodation and weight gain however, there was no relationship to stress and weight gain (Vella-Zarb, & Elgar, 2010). Limitations of the study included a small sample size, a return of 81% of the student for testing; the study lasted 11 weeks. The authors stated that if the study was longer, then more information could have been collected (Vella-Zarb & Elgar, 2010). The authors indicated that further research was needed on the relationship between accommodations and weight gain to further understand why students living in the resident halls were more vulnerable to weight gain than those living off campus.

Haff (2009) used data from the 2001 Youth Risk Surveillance Survey to examine select socio demographic and psychological correlation of weight perceptions and weight

control behaviors among Blacks, Hispanics, and White female adolescence students Grades 9 to 12 years. The sample size was 13,627 female students from private and public schools who participated in the survey. Weight perception, dieting behaviors, psychological factors, and physical activity were all measured. The results indicated there were significant differences between White and Black girls for measures of weight loss behaviors; significant differences were seen between White girls and Hispanic females for dieting behaviors, exercising, and eating less; no difference in describing weight between Blacks and Whites; however significant difference between Black and White for weight change behaviors (Haff, 2011). Black girls considered themselves slightly overweight, and White girls reported losing weight (Haff, 2011). The authors concluded that there were minimal differences across ethnic groups in views of body weight despite the large differences in self-reported or intended weight control methods (Haff, 2011). Racial identification and socioeconomic factors should be considered with prevention or intervention methods for with ethnic groups (Haff, 2011).

A study was conducted by Stanziano and Butler-Ajibade (2011) to examine variances “in health behaviors in diet and physical activity in African American women based on their body mass index.” Women with average ages of 19.5 years were studied using the modified National College Health Risk Behavior survey. Weight loss history, food choices, and physical activity occurrences were compared for overweight, normal weight, and obese groups, and analyzed using multiple 2 way analysis of variance (Stanziano & Butler-Ajibade, 2011). The results indicated that there was more frequency reported in the overweight students for vigorous physical activity and more resistance

training sessions than the other students. According to the authors, there were no differences in diet among the groups (Stanziano & Butler-Ajibade, 2011). According to the authors, the findings suggested that more studies needed to be conducted to determine the cause of obesity in African American women, and further studies were needed to examine portion sizes, nutritional density, and average daily intake.

### **Gap in Literature on Race/Ethnicity and Health Behavior**

This study examined the relationship between race/ethnicity, diet, and physical activity among college students in the United States Virgin Islands. The literature review indicated that the relationship between these factors was inconclusive. For example, several studies concluded that gender and ethnicity were related to physical activity (Arcan et al., 2007; Aruguete, DeBord, Yates & Edman, 2005; Kuchler & Lin, 2002; Neumark-Sztainer et al., 2008). However, other studies concluded that race was not significantly related (Haff, 2011; McArthur & Raedeke, 2009; Stanziano & Butler-Ajibade, 2011). Hala and Ray (2006) indicated that gender and race were significant in physical activity because of culture. However, Jeffery (2013) stated that gender was significant to physical activity for other reasons such as weight and stress management. Data from the CDC (2010) suggested that gender was significant in fruit and vegetable consumption. Other studies suggested the need for further research on these associations (Huang et al., 2003; Stanziano & Butler-Ajibade, 2011; Vella-Zarb & Elgar, 2010).

Schembre, Nigg, and Albright (2011) in their study of BMI and race found that race was not significant in relation to BMI. Freedman (2010) concluded that there was a relationship between race and weight gain, however, race was significant in students who

lived on and off campus and more studies needed to be conducted to examine the contribution that race plays in dietary habits of multiethnic populations. Willis, Isasi, Mendoza and Ainette (2007) concluded that gender and race were related to exercise patterns with increasing perceived barriers to exercise associated with less likelihood of exercising and gender strongly influences type of exercise.

Although literature exists about college students in the United States on their diet and physical activity behaviors, and how these variables were influenced by race, there was no literature on college students in the Virgin Islands. The student population studied represented a sample from a different racial/ethnic setting that allowed the examination of theoretical constructs in a more heterogeneous racial and cultural population with much less exposure to the factors that have contributed to the obesity epidemic in the mainland. These students lived with their parents until they were ready to go to college and their diet and physical activity choices may have been influenced by their racial/ethnic background. Although the native Virgin Island residents have similar exposure to media and fast food, the students from the surrounding islands do not, and examination of the transition between parental homes to college life was more pronounced. The data collected added to the gap in the literature on how diet and physical activity choices were influenced by their racial/ethnic background.

### **Literature on Methodology**

The literature review on methods found that most of the studies used questionnaires and surveys to gather the data. Surveys such as the Youth Risk Surveillance Survey, Behavioral Risk Factor Surveillance Survey, Youth Physical

Activity, and Nutrition survey were used to collect data from the participants (CDC, 2005; CDC, 2010; Haff, 2009; Zapata et al., 2008). Youth Risk Surveillance survey, Behavior Risk Survey, Youth Physical Activity and Nutrition survey all used likert type questions for data collection. Some studies for example, Stanziano and Butler-Ajibade (2011), Haff (2009), and Huang et al., (2003) used questionnaires to collect data. The sample was mainly a convenience sample and conducted in the class room setting where the students had to volunteer for the study (Haff, 2009; Huang et al., 2003; Stanziano & Butler-Ajibade, 2011). The students were asked to sign a consent form before they completed the questionnaire or survey. The length of the survey took from 15 minutes to one hour to complete. The population was students chosen from exercise classes, and undergraduate students enrolled in college courses.

One study used Survey Monkey online to collect the data. The students volunteered for the study and used the online survey. Some studies paid the participants a stipend, while others did not. Another type of sample used was random sampling but this was rare in the studies that were found. This study used a convenience sample and the data was collected from areas where the students gather such as health center, cafeteria, residence halls, wellness center, and student activities center. The students were asked to fill out a questionnaire after reading a consent form. Two studies were qualitative (Arcan et al., 2007; Boutelle & Neumark-Sztainer, 2008). Neumark-Sztainer et al. (2008) utilized a mixed method and examples of quantitative studies included Eglis, Bland, Melton and Czech (2011) and Suminski, Petosa, Utter and Zhang (2002).

### **Summary and Transition**

This literature review focused on the association between race/ethnicity, diet, and physical activity risk factors for obesity among college students. The chapter began with the search strategy, followed by presentation of the epidemiology of diet and physical activity as risk factors for obesity. The majority of the chapter examined the key independent variable of race, where some studies refer to as race, some as ethnicity, some as both, and some as culture. The social cognitive theory guided the study where dietary and physical activity habits were conceptualized as behavioral capability, and the constructs of observational learning (parental influence), and environment (how the situation changes from parents home to the college transition), were included as control variables. Applications of the theory as demonstrated in the literature were summarized.

Evidence from the literature review indicated inconclusive findings between the association of race/ethnicity and behavioral capability as they pertain to this study. The literature review on physical activity was not conclusive and, the views were mixed in that there were a relationship in some studies and none in others. Diet was found to be related to culture in most studies. Most researchers concluded that more research was needed in these areas. This study added to the knowledge about students in the U.S Virgin Islands on the association of heterogeneity of race/ethnicity, diet, and physical activity. The information gathered can be compared to the results found in other studies to determine if some of the results were the same or different. Based on the literature on methods, this study used a cross-sectional survey design. Chapter 3 addressed the research design and approach, sample and setting, and statistical analysis for the study.

## Chapter 3: Research Method

### **Introduction**

The purpose of this quantitative study was to examine the relationship of race/ethnicity, diet, and physical activity among college students in the U.S Virgin Islands. The multiethnic youth population of the U.S. Virgin Islands suffers from a 60% obesity rate. Data on how to increase both the awareness of the risks of college students' obesity and the tools to prevent and control obesity are useful to public health practitioners, policy makers, educators, and the community at large. The chapter addresses the research design and approach selected to answer the research questions. The research questions addressed the nature of the relationship of race/ethnicity to diet and physical activity behavioral capability among college students in the U.S Virgin Islands. The study research design and approach, setting and sample, data collection, and statistical analysis are discussed in this chapter.

### **Research Design and Approach**

This quantitative correlational study was conducted to examine the relationship between race/ethnicity, diet, and physical activity among college students in the U.S Virgin Islands. Quantitative research involves supporting or rejecting a hypothesis. The hypotheses stated that race/ethnicity was related to diet and physical activity behavioral capability in college students in the Virgin Islands. Although the literature suggests that there is some relationship among race, diet, and physical activity among college students, no data were found to support such a relationship for the population of college students in the U.S Virgin Islands.

A correlational study determines relationships (Munro, 2005). Correlational studies are used to determine whether a relationship exists in exploratory studies and in hypothesis testing, where the intent is to test a hypothesis about a relationship (Munro, 2005). In this study, I examined whether race/ethnicity impacts diet and physical activity. The independent variable was race/ethnicity, and the dependent variables were diet and physical activity. Control variables for the dietary habits were age and gender. The control variable for physical activity was gender. Although race/ethnicity is a categorical variable, for this study it was the variable that was influencing the two outcome variables. For this study, it was used as an antecedent, a cause, or an influence on the outcome.

The research question addressed the nature of the relationship between race/ethnicity and diet and physical activity among college students in the U.S Virgin Islands. The survey research design study was appropriate because it examined the relationship that existed between race/ethnicity and diet and physical activity among college students. The survey design provided a quantitative or numeric description of patterns or trends, attitudes, or opinions of the college student population (Creswell, 2009). This allowed for generalization from the sample about the population so that inferences could be made about the population's diet and physical activity choices. The survey design was chosen because it was easy to produce economically and made data collection easy (Creswell, 2009). The study design was cross-sectional using surveys as the data collection tool, hence the quantitative nature of the study.



### Setting and Sample

**Setting.** The population consisted of undergraduate students of the University of the Virgin Islands, St. Thomas campus. The population sampling frame consisted of all undergraduate students attending the university on the St. Thomas campus. This campus of the University of the Virgin Islands is located on the West End of St. Thomas, which “is located in the Caribbean between the Caribbean Sea and the North Atlantic Ocean, East of Puerto Rico” (VI Moving Center, 2011). According to the university’s *Spring Enrollment Fact Book* (2010-2011), the total enrollment for the spring 2011 semester was 1,554 students on the St. Thomas campus, out of which 897 were undergraduate students. Of the undergraduate full-time students, 12.4 % were listed as nonresident alien (could be of any race); 74.0% were Black, non-Hispanic; 0.1% were American Indian/Alaskan; 0.1% were Asian/Pacific Islander; 2.0% were Hispanic; 4.4% were White Non-Hispanic; and 5.9% were of unknown ethnicity (UVI Fact Book Spring 2010-2011). Enrollment numbers change from semester to semester, so at the time this study was conducted, the total number of students enrolled changed. Permission to conduct the study was obtained from the university’s research office and the Walden Institution Review Board (IRB). Students’ consent was obtained prior to completing the questionnaire.

**Sample.** Although the registrar’s office provided a list of combined graduate and undergraduate students for both the St. Thomas and St. Croix campuses, they were unable to separate the names from the St. Thomas campus only and denied the request to make this information available. The university does not offer students’ telephone numbers and email addresses to outside individuals; therefore, the survey was administered through a

convenience sample. An advantage of a convenience sample is that it is not as time consuming and repetitive as a random sample. Surveys were distributed in areas where college students gathered, such as dining halls, residence halls, the student activities center, the cafeteria, and the student health center. Prior to the study being conducted, flyers (Appendix D) were posted around campus informing the campus population of the study and asking students to participate. This was done only as a way to notify the university's community about the study and to encourage students to participate. I believe that knowledge lessened students' fears and gained their cooperation. The students knew about the study, so approaching them in areas where they gathered made it easier for them to volunteer.

### **Sample Size and Power Calculation**

The sample was drawn from the population of undergraduate full-time students at the University of the Virgin Islands, St. Thomas campus, which was estimated at 900 students. Power, effect size, and significance level all determine a good sample size (Munro, 2005). There are three things that affect power in a study: alpha level, effect size, and sample size (Munro, 2005). Cohen's  $d$  is a measure of effect size; the formula is based on the  $t$ -statistic and is calculated as  $d = m1 - m2 / sd$ . Cohen (1987) defined a small effect size as  $R^2$  of 0.02, a moderate effect size of 0.13, and a large effect size of 0.30. The accepted value for power is .80, alpha level = .05, and the effect size varies on a number of factors (Burkholder, n.d.). McArthur and Raedeke (2009) conducted a study to assess sex and race differences on correlates of physical activity among college students. ANOVA revealed significant differences in active and inactive students, with effect sizes

between the two groups ranging from .33 to .63. Active and inactive students placed more importance on mental health for exercise, with  $d = 0.35$  and  $0.22$ ; the difference between these groups for  $d = 0.2$  to  $0.41$ . According to Cohen (1987), an effect size of  $< .50$  is considered small. Another study (Franko et al., 2008) determined whether college students exposed to a nutrition-based program changed their eating and physical activity behaviors. Effect sizes for significant findings ranged from  $0.11$  to  $0.19$ . By Cohen's definition, this is a small effect size, as it was less than  $0.50$ .

The sample size for the present study was calculated using Raosoft online sample size calculator (Raosoft, Inc., 2004). The margin of error chosen was 5%, the confidence level was 95%, the population size was 900, and the response distribution was 50%. The minimum sample size for the study was calculated at 270 students. The independent variable was race/ethnicity, and the dependent variables were diet and physical activity behavioral capability.

### **Survey Instrument and Materials**

The Eat Survey II was designed for college students between the ages of 18 and 23 years (University of Minnesota, 2012). This instrument was developed by the University of Minnesota to investigate factors influencing eating habits of adolescents, to assess whether youth were meeting national dietary recommendations, and to examine the dietary and physical activity patterns among youth (University of Minnesota, 2011). The EAT Survey II addresses youth weight, how youth control their weight behaviors, and dietary intake patterns targeted in Healthy People 2010 (University of Minnesota, 2011). The variables addressed in this survey included gender, ethnicity/race, overweight

status, and individual's concern about health and physical activity (University of Minnesota, 2011).

From the original 97-item Eat Survey II, 34 items were selected for this study because they were specific to diet and physical activity choices of the college student population and the constructs of the SCT needed to test hypotheses. Other than selecting a subset of the items, no changes to the response categories or psychometric properties of the scales were made. Permission was requested and granted from the authors to use only this limited set of questions, as the rest of the questions did not provide measures to answer the research questions and imposed an extra burden on participants without contributing new knowledge. Of equal importance, there were no psychometric issues involved that would threaten the validity of the measures by limiting the study to 34 relevant questions, because the developers of the instrument stated that the psychometric properties would not be violated given that the scales were intact.

The modified instrument consists of 34 questions that examined the study variables. Questions two and three addressed age and gender; these were the control variables. Question four examined the independent variable race/ethnicity. Questions 5 through 9 examined place of residence of the students whether on or off campus. Question 9 addressed the dining plan of the students. The dependent variables were examined in questions 10 through 33. Questions 10 through 29 examined the students' diet in terms of fruits and vegetables, availability of meals, and frequency of meals. These questions also measured the students' perceptions of meals intake and barriers to meals. Questions 30-33 examined the students' physical activity levels and perceptions.

## **Operational Measures**

Table 2 illustrates the description of the items in the survey and the operational measures to be derived as dependent, independent and control variables. The dependent variables consisted of two dietary habits and three physical activity habits. Dietary habits consisted of weekly frequency of eating meals and parental influence on eating. For example, a student who never ate breakfast, eat lunch 5-6 days a week, and dinner every day would have their Weekly Meals calculated as  $=1+4+5=10$ . Physical activity habits measured mild, moderate and strenuous amounts per week. The hours of physical activity were calculated based on the students' response and then categorized into mild moderate or strenuous. Control variables for diet were age and gender. Control variable for physical activity was gender. The independent variable and key construct was racial/ethnic heterogeneity. The categories included Black Non-Hispanic, White Non-Hispanic, Hispanic, Virgin Islander, Caribbean West Indian, and Other. These responses represented what individuals considered their cultural group and represented racial mixtures in much higher proportions than in the U.S mainland. Table 2 included the type of variables and value, response categories and survey questions.

Table 2

*Description of Operational Measures for Race/Ethnicity and Dietary Resources*

Variables	Survey question	Response category	Type of variable
Eating/dietary habits— Parents' influence on eating	27. My mother	1 = Not at all	Dietary influence
	a. cares about eating healthy food	2 = A little	Ordinal scale
	b. cares about staying fit and exercising	3 = Somewhat	6 items
	c. diets to lose weight or keep from gaining weight	4 = Very much	Range—6-24
	d. encourages me to eat healthy foods	5 = Don't know	
	e. encourages me to be physically active	I don't know = no (recode 5 to 1)	
	f. encourages me to diet to control my weight		
Eating/ dietary habits— Frequency of eating meals	10. During the past week, how many days did you eat breakfast, lunch and dinner?	1 = never 2 = 1-2 days 3 = 3-4 days 4 = 5-6 days 5 = every day	Meal frequency Ordinal scale 3 items Range—5-15
Physical activity: Mild, moderate, or strenuous	32. In a usual week, how many hours do you spend doing the following exercises:  Mild/Moderate/Strenuous	1 = mild 2 = moderate 3 = strenuous	PA intensity Ordinal 3 items
Race/ethnicity	4. Do you think of yourself as?	1 = White 2 = Black or African American 3 = Hispanic or Latino 4 = Asian American 5 = Hawaiian or Pacific Islander 6 = American Indian or Native American 7 = Virgin Islander 8 = Caribbean West Indian	Race/Ethnicity Nominal or categorical Range (1-8) 1 item
Gender	2. Are you?	1 = Male 2 = Female	Gender Nominal, control variable 1 item
Age	3. What is your age?	Actual number	Age Continuous, control 1 item

*Note.* The questions were used with permission from the EAT Survey II developers. Please see Appendix F for approval letter.

Project Eat II was the follow-up study of the Project EAT I. Project EAT I was an observational study that surveyed 4,746 high school students in 31 Minnesota schools (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006). Self-reported measures were used to collect information from a large diverse population of the socio-environmental, personal, and behavior causes of dietary intake and weight status (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006). The same participants were resurveyed to examine changes in their weight and eating patterns as they grew from early adolescence to middle and from middle to young adulthood (Neumark-Sztainer, Eisenberg, & Hennan, 2006).

The Eat Survey II researchers selected numerous constructs to be included in the final project survey. These constructs included general questions about race, gender and place of residence, eating habits, family and friends influence on eating habits, health and weight and participation in physical activity. The constructs used for this study were general questions such as place of residence, age, gender, dietary habits, parental influence on eating habits, and physical activity.

The survey consisted of 34 questions (Appendix A). Questions 1 through 9 were general questions addressing gender, race/ethnicity, age, residence for past month and year, and students' status. Dietary habits consisted of 11 questions; how family and friends affected eating habits consisted of five questions and physical activity consisted of 3 questions. The dependent variables were weekly frequency of eating meals, parental influence of eating meals, and physical activity intensity. The dependent variables derived from Larson, Neumark-Sztainer, Story, van den Berg, and Hannan (2011) Survey

Development Eat Project. In the original survey, suitable measures were identified by searching the literature and reviewing other surveys of youth that focused on health and weight behaviors (Larson et al., 2011). To allow for consistency measures, previously examined topics were taken from the other EAT Surveys. Item analysis was conducted for each measure that was piloted for test–retest reliability; this included descriptive statistic and response distribution patterns to identify problems with wording (Larson et al., 2011). Pearson correlations were used for interval variables and Spearman correlations for ordinal variables to be calculated for each pilot measure to examine reliability over time (Larson et al., 2011). Cronbach alpha, item total correlations and inter-item correlation were calculated to assess internal consistency (Larson et al., 2011).

### **Validity and Reliability of the Instrument**

Project Eat II was a follow-up study of the Project EAT I. Project EAT I was an observational study that surveyed 4,746 high school students in 31 Minnesota schools (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006). Self-reported data were collected from a large diverse population of the socio-environmental, personal, and behavior determinants of dietary intake and weight status (Haines, Neumark-Sztainer, Eisenberg & Hannan, 2006). The same participants for EAT Project II were resurveyed “to examine changes in their eating patterns and weight as they progressed from early adolescence to middle and from middle to young adulthood” (Neumark-Sztainer, Eisenberg & Hennan, 2006). The parents signed consent forms before the students completed the surveys. A total of 1,074 or 22% of the original study population were lost to follow-up due to missing contact information. However, of the remaining 3,672 who



were contacted by mail, 2,516 completed the surveys (Neumark-Sztainer, Eisenberg & Hannan, 2006).

The researchers were contacted about the reliability and validity of the instrument because I was unable to find any literature on the validity of the instrument. The Project Director of the EAT Project III responded that no testing was done for validity on the instrument. However, the reliability of the instrument can be determined by results of the repeated survey on the EAT II because the same instrument was used to collect the data.

The development of the survey was directed by the social cognitive theory and focused on socio-environmental, personal, and behavioral determinants of diet and other weight related behaviors (Larson, Neumark-Sztainer, Story, Van den berg, & Hannan, 2011). Psychometric properties were used to determine the reliability of the instrument. Survey pilot testing, test-retest reliability testing, online pilot testing, and longitudinal survey administration were conducted (Larson, Neumark-Sztainer, Story, Van den berg, & Hannan, 2011).

According to the authors, item analysis was conducted for each measure that was piloted for the test-retest reliability, including examination of the descriptive statistics, and response to distribution patterns. Test-retest correlations or percent agreements were computed to determine reliability over time. Cronbach's alpha, item total correlations and inter-item correlations were computed for each scale to determine internal consistency. Cronbach's alpha was greater than 0.7 for 83% of the proposed scales (Larson, Neumark-Sztainer, Story, Van den berg, & Hannan, 2011). The test-retest reliability for the items on the final instrument were mostly moderate to good; 43% of computed correlations

were greater than 0.7. The items assessed by percent agreement reliabilities were greater than 0.7 for 83% of the scales (Larson, Neumark-Sztainer, Story, Van den Berg, & Hannan, 2011).

Reliability is the ability of an instrument, or the extent to which the instrument can obtain the same results on repeated trials (Trochim, 2006). Findings from EAT I indicated a decrease in fruits and vegetable consumption during the first 5 years of the project while students attended middle to high school, and EAT II found a continued decrease in fruit and vegetable consumption in the same cohort as they transitioned from high school to college. These findings indicated that the instrument is moderately reliable in this area. The surveys also indicated that nutrition across race varies significantly between African American, Native American, Whites, Asian American, and Hispanics (University of Minnesota, 2012). There is also a strong reliability of the instrument in these areas. EAT I and EAT II were highly reliability in areas of teens eating breakfast irregularly; unhealthy dieting behaviors and high obesity rates among teens. The instrument was fairly reliable in the area of physical activity. EAT I showed that teens were extremely active as opposed to survey EAT II showing a decrease in physical activity among teens. In the area of computer use and physical activity, the instrument was moderately reliable as both showed an increase in computer use among teens.

The instrument has also been used in multiple studies that measured different variables among high school students, college students, and young adulthood in addition to the EAT Project. The studies assessed ethnically diverse youth and their parents in a variety of settings. Studies conducted but not limited to family meals and adolescents,

eating behaviors and perceptions of food among youth, parental eating behaviors, and the correlates of eating patterns among youth. Most of the studies' design utilized focus groups, parent interviews, and used the Project EAT survey II. Some of the studies were pilot tested using the test-retest reliability of questions. Others studies used the EAT Survey II and depended on the reliability of the EAT I survey.

### **Data Collection**

The students were asked to volunteer for the survey. Flyers advertising the study (Appendix D) were posted around campus a week prior to collecting the data. Flyers were posted in all areas where the students gathered such as the University's dorms, wellness center, student activity center, and student health center. The intent of the flyer was to inform the University's community of the upcoming study and to encourage students to participate. A letter of request to place data collection locked boxes was sent to each department such as the housing department, wellness center, student activity center, and student health center. The researcher hosted a table to collect data in these areas at a set day and time in the week. All eligible students were asked to volunteer for the study and were asked to read the consent form prior to completion. Questionnaires were distributed in all places where students gathered such as the library, Sports and Fitness Center, cafeteria, Students' Activity Center, and Students' Health Center.

All undergraduate, full time students were eligible to participate in the study. It was estimated that the survey will take 15 to 30 minutes to complete. The researcher distributed the questionnaires and collected the completed ones from the locked boxes daily. Those questionnaires that were distributed at places where students gather were

placed in a locked drop box by the students and collected by the researcher. The students did not place their names on the surveys but were assigned a number from 1- 307. The estimated time for data collection was four to six weeks. Participants who had questions contacted the researcher by email, phone, or on site. The data were collected from the locked boxes and stored in the researcher home office in a locked cabinet.

The paper questionnaire was in English. The data for this study was collected after permission was granted from Walden University IRB and the University of the Virgin Islands. For this study, the data was collected using the selected items from the EAT Project survey II questionnaire, entered into Microsoft excel and then imported into SPSS, a software used for statistical analysis. The software allowed for data entry and analysis, graphs and maps.

### **Statistical Analysis**

The data collected examined diet, physical activity, and race of the college students. This study used descriptive statistics to determine the frequency of the dietary and physical activity behaviors among the demographic characteristics of the sample. In addition, the characteristics of the sample were examined by place of origin, whether from the Virgin Islands or visiting students from other islands in the Caribbean.

Correlation was conducted to determine the psychometric properties of the scales on this sample, including item analysis (response distribution patterns), Cronbach's alpha, item total correlations and inter-item correlations (internal consistency). The reliability of the data may not be affected because the questions related to this study did not change. It was recommended by the survey developers and permission was granted to use only the

questions that were required in the proposed study (Appendix F). However, reliability was determined using Cronbach's Alpha, which is generally used to measure internal consistency or reliability (Munro, 2005). The EAT II data indicated moderate correlations and variation between mainland racial groups. It was important to determine to what extent the scales can measure the constructs with reliability among Caribbean racial groups. Data were collected using hard copy questionnaires. Visual examination of questionnaires provided review and final coding of all variables including codes for missing data. Data was entered and analyzed using SPSS, Version 21.

### **Research Questions and Hypotheses**

The research questions and hypotheses were derived from the literature review in the area of diet and physical activity and the constructs of the social cognitive model. As stated throughout, the purpose of the study was to examine behavioral capability in the context of heterogeneity of race/ethnicity in the Caribbean population attending the University of the Virgin Islands. The groups that were dominant were the Black or African American, Virgin Islander and Caribbean West Indian and these three groups were expected to exhibit differences in behavior, parental influence, and adaptation to new environmental situation. The rest of the comparison groups include, White, Hispanic or Latino, Asian American, and Hawaiian or Pacific Islander.

#### **Research Question 1**

To what extent does race/ethnicity modify the behaviors of weekly frequency of eating meals among college students in the United States Virgin Islands?

Hypotheses 1<sub>O</sub>: There is no relationship between race and weekly frequency of eating meals among college students in the United States Virgin Islands

Hypotheses 1<sub>A</sub>: There is a relationship between race/ethnicity and weekly frequency of eating meals among students in the United States Virgin Islands.

Statistical Plan: Independent Variable = Race/Ethnicity; Dependent Variable = weekly frequency of eating meals (1, 5); Statistical Test: Ordinal Logistic Regression

Control variables: Age and Gender.

### **Research Question 2**

What is the correlation between race and parental influence on consumption of meals?

Hypotheses 2<sub>O</sub>: There are relationships between race/ethnicity and parental influences of consumption of meals.

Hypotheses 2<sub>A</sub>: There are no relationships between race/ethnicity and parental influences of meal consumption.

Statistical Plan: Independent variable = Race; Dependent variable = parental influence on eating (6, 24); Statistical test; Ordinal Logistic Regression

### **Research Question 3**

To what extent does race/ethnicity influence physical activity among college students in the US Virgin Islands?

Hypothesis 3<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Strenuous Physical Activity per Week

Hypothesis 3<sub>A</sub>: There are relationships between Race/ethnicity and amount of Strenuous Physical Activity per Week

Statistical Plan: Independent Variable = Race/ethnicity; Dependent Variable = StrenuousPA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

Hypothesis 4<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Moderate physical activity per week

Hypothesis 4<sub>A</sub>: There are relationship between Race/ethnicity and amount of Moderate physical activity per week

Statistical Plan: Independent Variable = race/ethnicity; Dependent Variable = ModeratePA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

Hypothesis 5<sub>O</sub>: There are no relationships between Race/ethnicity and amount of Mild physical activity per week

Hypothesis 5<sub>A</sub>: There are relationships between Race/ethnicity and amount of Mild physical activity per week

Statistical Plan: Independent Variable=Race/ethnicity; Dependent Variable = MildPA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

### **Logistic Regression Analysis**

Logistic regression is used when there is at least one independent variable of any type (nominal, ordinal, continuous) and the dependent variable has been recoded as binary or dichotomous such as yes or no (David, 2012). Studies that were conducted using the EAT survey used a variety of variable types and analysis depended on the type of outcome variable studied. Predicting the outcome based on a set of variables is defined

as logistic regression (David, 2012). The independent variable for this study was race/ethnicity. The dependent variables were diet and physical activity behavioral capability. Logistic functions are used to show the probability  $p$  of one variable may be affected by another variable,  $p = P(a + bx)$ . The logistic equation is

$Z = b_0 + b_1x_1 + b_2x_2 + \dots + b_kx_k$ .  $Z$  is the odds of the dependent variable (frequency of dietary or physical activity habits),  $b_0$  is the constant,  $x$  is the independent variable (race/ethnicity) or covariates,  $k$  is the number of independent variables, and  $b$  is the logic coefficient or slope (David, 2012).

The study used the odds ratio to examine the odds of dietary and physical activity habits given a particular race/ethnicity controlling for resources and environment. The dependent variable was examined for the odds ratio based on each independent variable category. An odds ratio significantly different from 1.0 indicates that diet and physical activity are predicted by race (David, 2012). To test for significance ( $p$  value), the likelihood ratio test was used. This test “is the probability that the observed values of the dependent variable may be predicted from the observed values of the independent variable” (David, 2012).

### **Threats to External Validity**

The study was conducted on the island of St. Thomas U.S Virgin Islands at the University of the Virgin Island and may not be representative of all college students in the Caribbean. However, this should not be a threat to internal validity as the study was designed for students only in the U.S Virgin Islands. The study was generalized to both



campuses because the students on the St. Croix campus are of the same racial background as those on St. Thomas.

### **Threats to Internal Validity**

Some students might misinterpret the instructions on how to complete the survey. The direction on the survey was read twice and the students were allowed to ask any questions on site by email, or by phone. Maturation might occur depending on the time of day the students complete the survey. Their focus might decrease because of fatigue. Students were asked to take time to answer the questions.

### **Protection of Human Participants**

The survey process did not record names of students who completed the questionnaire. The students did not put their names on the questionnaires, and only read the consent form to acknowledge their participation, as the survey was voluntary. Both the Walden University and the University of the Virgin Islands institutional boards reviewed and approved the study. The students were informed that the data will be shared with all the stakeholders to further develop appropriate interventions.

### **Ethical Concerns**

Permission was obtained from the University of the Virgin Islands Internal Review Board # 582491-1 (Appendix G) and the Walden University IRB # 03-14-14-0110147 to conduct the study. During the data collection process, the students provided primary data about their diet and physical activity behaviors. They could have provided information to each other about the questions of the study; however, this was controlled by stressing to the students the importance of not sharing information with each other.

The study used a convenience sample, so the chances of any participant withdrawing from the study did not affect the outcome. The students' names were not placed on the surveys. The collected surveys were placed in a locked file drawer during and after data collection. The raw data will be kept by the researcher for up to five years which is minimum requirement. Electronic data with publication information will be kept until the manuscript is published. The surveys will be destroyed after the study is completed and the results disseminated.

### **Dissemination of Findings**

The rising obesity rates are becoming a concern for the future of American youths (Ajibade, 2011). Between 1991 and 1997, the greatest increase in the obesity prevalence was among 18-19 years old with a college education (Huang et al., 2003). By 2010, nearly 21% of individuals between ages 18- 24 were obese (Cholewa & Irwin, 2008). Overweight and obesity are defined as individuals' ranges of weight that are greater than what is considered healthy for a given height, and these ranges of weight have shown to increase risks for certain diseases and other health problems (CDC 2010).

The goal of health professionals and policy makers should be to reduce the rate of obesity. The study's results will be shared with the University of the Virgin Islands' President, students, faculty and staff, parents, local government, senate, as well as Health Departments. The information will also be shared with some other Caribbean islands that the student reside such as St. Kitts, Nevis, Antigua, the British Virgin Islands, Anguilla, St. Croix and St. John. This information can be used to develop health interventions and programs specific to ethnic groups in an effort to reduce obesity rate among college

students. The information will be shared with other universities and colleges in the Caribbean. The results will also be published in peer reviewed journals such as American Journal of Public Health and American College Health Journal. The results added to the gap in literature about college students in the Virgin Islands.

### **Summary and Transition**

In this chapter, the research design and approach, research questions and hypothesis, sample size, setting and sample, survey instrument, human protection, and dissemination of findings were discussed. The study examined the relationship between race/ethnicity, diet and physical activity among college students in the U.S Virgin Islands. The sample population was undergraduate full time students at the University of the Virgin Islands, St. Thomas campus. The study utilized relevant measures from the Eat Survey II that was designed and validated for college students. The study results will be shared with the University of the Virgin Islands President, students, faculty and staff, parents, local government, senate, as well as Health Departments.

## Chapter 4: Results

### **Introduction**

The purpose of this quantitative study was to examine the relationship between race/ethnicity and diet and physical activity among college students in the U.S Virgin Islands. The results of the research are presented in descriptive format along with tables. The chapter is divided into sections addressing the characteristic of the sample, ordinal logistic regression analysis, hypothesis testing results, and a summary. SPSS v. 21 was used for the analysis.

This quantitative correlational study was conducted to examine the relationship between race/ethnicity and diet and physical activity among college students in the U.S Virgin Islands. The required sample was 270 students, with a total of 307 completing the questionnaires. There were 15 questionnaires that were missing data; these were excluded from the analytical sample, and no data were imputed from the 15 questionnaires. The study used descriptive statistics to determine the frequency of the dietary and physical activity behaviors among the demographic characteristics of the sample. In addition, the characteristics of the sample were examined by place of origin, gender, frequency of eating meals, mild and moderate physical activity, race/ethnicity, and age. Correlation was conducted to determine the psychometric properties of the scales on this sample, including item analysis (response distribution patterns), Cronbach's alpha, item total correlations, and interitem correlations (internal consistency). Reliability was determined using Cronbach's alpha, which is generally used to measure internal consistency or reliability (Munro, 2005). Data were collected using hard-copy questionnaires. Visual

examination of questionnaires was used in the review and final coding of all variables, including codes for missing data. Data were entered and analyzed using SPSS, Version 21. Data collection began in the summer months and extended into the fall semester.

### **Characteristics of the Sample**

The characteristics of the sample are presented in Table 3 using percentages and frequencies of the students' gender, age, ethnicity, and place of residence. The participants were undergraduate students from the University of the Virgin Islands ages 18 years and older. Among participants who completed the questionnaires, 32% were male and 67.1% were female. Sixty percent of the students lived off campus, while 39.1% lived on campus. The majority of the students were between the ages of 18 and 25 years (82.4%).

Table 3

*Frequencies and Percentages on Participant Characteristics*

Characteristic	<i>N</i>	%
<b>Gender</b>		
Male	101	32.9
Female	206	67.1
<b>Ethnicity/Race</b>		
White	21	6.8
Black or African American	129	42.0
Hispanic or Latino	12	3.9
American Indian or Native American	2	0.7
Virgin Islander	77	25.1
Caribbean West Indian	62	20.2
Other	4	1.3
<b>Residence</b>		
On campus	187	60.9
Off campus	120	39.1
<b>Age</b>		
18-25	253	82.4
25-35	40	13.0
36-46	8	2.6
47 and older	6	2.0

### **Physical Activity of Participants**

Diet and physical activity behaviors among undergraduate students at the University of the Virgin Islands were examined. As shown in Table 4, data on physical activity included frequency and hours performed per week; participants were asked about mild, moderate, and strenuous weekly physical activity. The students were asked about their physical activity hours for ½ to 2 hours per week. The results indicated that 23% of the students performed mild exercise; 22.8% performed 6 or more hours of mild physical activity per week, and 9.4% did not perform any mild physical activity per week.

For moderate physical activity per week, 22.1% of the students performed 2.5 hours to 4 hours per week; 21.8% performed ½ hour to 2 hours of moderate physical activity per week; and 18.2% of the students performed no moderate activity per week. For strenuous physical activity, 31.6% of the students did not perform any strenuous activity per week, and 25.4% of the students performed ½ hour to 2 hours of strenuous physical activity per week. These figures are presented in Table 4.

Table 4

*Participants' Physical Activity per Week*

Hours per week	<i>N</i>	%
<b>Mild activity</b>		
None	29	9.4
Less than ½ hr	54	17.6
½–2 hrs	72	23.5
2 ½–4 hrs	45	14.7
4 ½–6 hrs	37	12.1
6-plus hrs	70	22.8
<b>Moderate activity</b>		
None	56	18.2
Less than ½ hr	53	17.3
½ hr–2 hrs	67	21.8
2 ½ hrs–4 hrs	68	22.1
4 ½ hrs–6 hrs	33	10.7
6-plus hrs	30	9.8
<b>Strenuous activity</b>		
None	97	31.6
Less than ½ hr	43	14.0
½ hr–2 hrs	78	25.4
2 ½ hrs–4 hrs	45	14.7
4 ½ hrs–6 hrs	20	6.5
6-plus hrs	24	7.8

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.



### **Dietary Habits**

The students' dietary consumption habits were examined by type of meal (breakfast lunch and dinner) and frequency. According to Table 5, 29% ate breakfast one to two days per week, and only 6.2% of the students ate breakfast 5-6 days, nearly half (46.3%) answered they ate lunch daily in the past week; and only 3.9% of the students indicated that they did not eat dinner for the past week.

According to Table 5, 38% of the participants snacked two to three times, and 24.4% of the students did not snack. Forty- eight percent ate from a fast food restaurant while 29% never ate from a fast food restaurant. Forty-three percent of the students indicated food and vegetables were cooked at their residence.

Table 5

*Frequency of Meal Consumption by Participants*

Type of meal	<i>N</i>	%
<b>Breakfast</b>		
Never	48	15.6
1-2 days	90	29.3
3-4 days	68	22.1
5-6 days	19	6.2
Every day	82	26.7
<b>Lunch</b>		
Never	6	2.0
1-2 days	31	10.1
3-4 days	75	24.4
5-6 days	53	17.3
Every day	142	46.3
<b>Dinner</b>		
Never	12	3.9
1-2 days	30	9.8
3-4 days	83	27.0
5-6 days	47	15.3
Every day	135	44.0

*(table continues)*

Type of meal	<i>N</i>	%
Snack	76	24.8
0 time		
1 time	66	21.5
2-3 times	119	38.8
4-5 times	29	9.4
More than 5 times	17	5.5
Eat fast food		
Never	89	29.0
1-2 times	148	48.2
3-4 times	57	18.6
5-6 times	9	2.9
7 times	3	1.0
More than 7 times	1	0.3
Fruits and vegetables cooked at residence		
Never	17	5.5
1-2 days	64	20.8
3-4 days	93	30.3
5-6 days	133	43.3
College dining plan		
Yes	124	40.4
No	183	59.6

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

### **Parents' and Friends' Influence on Diet and Physical Activity**

The study examined how parents and friends influenced physical activity and healthy eating. Students were asked to rate how their parents cared and encouraged them to eat healthy and engaged in physical activity. Forty-nine percent of the students indicated that their parents cared about eating healthy while 7.2% stated their parents did not care about eating healthy. Table 6 examined these results. The students indicated that 51.5% of their parents encouraged them to eat healthy while 8.1% did not encourage them. Physical activity was also examined. Thirty-eight percent of the parents cared about physical activity while 8.1% did not care. Forty-three percent of the parents encouraged physical activity while 9.4% did not. Participants were asked about how their friends cared about eating and physical activity. Forty-eight percent stated that their friends somewhat cared about physical activity, while 6.8% percent indicated that their friends do not care about physical activity.

Table 6

*Parents' and Friends' Influence on Healthy Habits*

Family and friends' influence	<i>N</i>	%
Parents care about healthy eating		
Not at all	22	7.2
A little	25	8.1
Somewhat	107	34.9
Very much	153	49.8
Parents encourage healthy eating		
Not at all	25	8.1
A little	30	9.8
Somewhat	94	30.6
Very much	158	51.5
Parents care about physical activity		
Not at all	25	8.1
A little	41	13.4
Somewhat	122	39.7
Very much	119	38.8
Parents encourage physical activity		
Not at all	29	9.4
A little	41	13.4
Somewhat	95	30.9
Very much	142	46.3
Friends care about healthy eating		
Not at all	31	10.1
A little	55	17.9
Somewhat	150	48.9
Very much	59	19.2
Friends care about physical activity		
Not at all	21	6.8
A little	57	18.6
Somewhat	148	48.2
Very much	70	22.8

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

### Theoretical Framework

Table seven examines social cognitive constructs. Environmental construct is represented by the question fruits and vegetables are cooked where I lived. The participants responded to how often fruits and vegetables are cook where they live; 43.3% responded to fruits and vegetables being cooked 5-6 days of out the week, and 5.5% responded fruits and vegetables were never cooked. Situation construct was measured by using the question how often fruits and vegetables available at place of resident; 44% of the students stated fruits and vegetables were available, while 2% responded negatively to this questions.

Table 7

*Social Cognitive Constructs*

Students' perception of healthy behavior	<i>N</i>	%
Foods I eat affect my health	17	5.5
Strongly disagree		
Disagree	21	6.8
Agree	85	27.7
Strongly agree	184	59.9
How much you care about eating healthy foods		
Not at all	10	3.3
A little	27	8.8
Somewhat	96	31.3
Very much	174	56.7
How much you care about staying fit and exercise		
Not at all	10	3.3
A little	27	8.8
Somewhat	96	31.3
Very much	174	56.7
How confident you are you can change your eating pattern to healthy		
Not at all confident	66	21.5
Very confident	241	78.5
Fruits and vegetables available where I live		
Never	8	2.6
1-2 days	57	18.6
3-4 days	105	34.2
5-6 days	137	44.6

*(table continues)*

Students' perception of healthy behavior	<i>N</i>	%
Fruits and vegetables cooked where I live		
Never	17	5.5
1-2 days	64	20.8
3-4 days	93	30.3
5-6 days	133	43.3
Parents care about healthy diet		
Not at all	22	7.2
A Little	25	8.1
Somewhat	107	34.9
Very much	153	49.8
My friends care about staying fit and healthy		
Not at all	25	8.1
A little	41	13.4
Somewhat	122	39.7
Very much	119	38.8

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

### Hypothesis Testing

The study focused on three research questions. Ordinal logistic regression was used to test the hypothesis. The study examined race, diet and physical activity among college students in the U.S Virgin Islands. All three research questions were tested using ordinal logistic regression.

#### Research Question 1

To what extent does race/ethnicity modify the behaviors of weekly frequency of eating meals among college students in the U.S Virgin Islands?



Hypotheses 1<sub>O</sub>: There is no relationships between race and weekly frequency of eating meals among college students in the U.S Virgin Islands

Hypotheses 1<sub>A</sub>: There is a significant relationship between race/ethnicity and weekly frequency of eating meals among students in the U.S Virgin Islands.

Statistical Plan: Independent Variable = Race/Ethnicity; Dependent Variable = weekly frequency of eating meals (1, 5); Statistical Test: Ordinal Logistic Regression (Table 2).

Table 8 examines the frequency of meal consumption with ethnicity/race. Logistic regression was used to test the hypothesis. Frequency of eating meals for breakfast was significant for Hispanic ( $p < .038$ ) and Caribbean students ( $P < .045$ ). Ethnicity/race significantly predicted consumption of dinner meal ( $p = 0.00$ ) for Whites, Hispanic, Virgin Islander, and Black or African American. There is support for the null hypothesis for lunch however there is no support for the null hypothesis for consumption of dinner and breakfast meals so the alternative hypothesis was favored.

Table 8  
*Logistic Regression and Frequency of Meal Consumption by Ethnicity/Race*

Race/ethnicity breakfast	Std. error	Wald	Df	Sig	95% confidence interval	
					Lower bound	Upper bound
White	1.221	2.139	1	.144	-4.178	.607
Black or African American	1.167	3.251	1	.071	-4.393	.183
Hispanic or Latino	1.268	4.306	1	.038	-5.118	-.146
American Indian	1.715	2.149	1	.143	-5.874	.847
Virgin Islander	1.175	3.648	1	.056	-4.546	.059
Caribbean	1.179	4.035	1	.045	-4.680	-.057
<b>Lunch</b>						
White	1.262	1.549	1	.213	-4.045	.903
Black or African American	1.209	.919	1	.338	-3.528	1.211
Hispanic or Latino	1.308	1.616	1	.204	-4.226	.901
American Indian	1.774	.614	1	.433	-4.866	2.087
Virgin Islander	1.216	1.896	1	.168	-4.057	.709
Caribbean	1.220	1.814	1	.178	-4.034	.748
<b>Dinner</b>						
White	.487	1151.253	1	.000	-17.487	-15.577
Black or African American	.282	3710.079	1	.000	-17.741	-16.635
Hispanic or Latino	.569	1014.530	1	.000	-19.225	-16.997
American Indian	3332.151	.000	1	1.000	-	6530.896
Virgin Islander	.311	3064.402	1	.000	-17.847	-16.626
Caribbean	.000	.	1	.	-17.284	-17.284

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

**Research Question 2**

What is the relationship between race and parental influence on consumption of meals?

Hypotheses 2<sub>o</sub>: There are no relationships between race/ethnicity and parental influences of consumption of meals.

Hypotheses 2<sub>A</sub>: There are significant relationships between race/ethnicity and parental influences of meal consumption.

Statistical Plan: Independent variable= Race; Dependent variable= parental influence on eating (6, 24); Statistical test; Ordinal Logistic Regression

Table 9 examines parents influence on consumption of meals. SPSS ordinal logistic regression was used to analyze research question 2. The data appeared to be consistent with the null hypothesis where there were no relationships between race/ethnicity and parental influences on meal consumption. The results indicated there was support for the null hypothesis for African American or Blacks parents encourage to eat ( $p = 0.800$ ); parents caring about eating ( $p=0.486$ ); Virgin Islanders parents encourage to eat ( $p = 0.486$ ) and Virgin Islands parents care about eating ( $p = 0.351$ ).

Table 9

*Logistic Regression and Parental Influence on Consumption of Meals*

Parental influence on consumption of meals	Std. error	Wald	df	Sig	95% confidence interval	
					Lower bound	Upper bound
Parents encourages to eat healthy						
White	1.020	.674	1	.412	-2.838	1.162
Black or African American	.955	.064	1	.800	-1.631	2.114
Hispanic or Latino	1.080	.109	1	.741	-2.472	1.760
American Indian	1.582	.713	1	.398	-4.437	1.765
Virgin Islander	.964	.003	1	.955	-1.944	1.835
Caribbean	.974	.229	1	.633	-1.443	2.373
Parents cares about eating						
White	1.151	2.61	1	.106	-4.119	.394
Black or African American	1.091	.486	1	.486	-2.899	1.378
Hispanic or Latino	1.203	1.57	1	.210	-3.865	.849
American Indian	1.685	1.05	1	.304	-5.036	1.570
Virgin Islander	1.099	.869	1	.351	-3.179	1.130
Caribbean	1.107	.149	1	.699	-2.598	1.742

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

**Research Question 3**

To what extent does race/ethnicity related to physical activity among college students in the US Virgin Islands?

Hypothesis 3<sub>0</sub>: There are no relationship between Race/ethnicity and amount of strenuous physical activity per week

Hypothesis 3<sub>A</sub>: There are relationship between Race/ethnicity and amount of strenuous physical activity per Week

Statistical Plan: Independent Variable=Race/ethnicity; Dependent Variable = Strenuous PA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

Hypothesis 4<sub>O</sub>: There are no relationships between Race/ethnicity and amount of moderate physical activity per week

Hypothesis 4<sub>A</sub>: There are relationships between Race/ethnicity and amount of moderate physical activity per week

Statistical Plan: Independent Variable = race/ethnicity; Dependent Variable=Moderate PA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

Hypothesis 5<sub>O</sub>: There are no relationships between Race/ethnicity and amount of mild physical activity per week

Hypothesis 5<sub>A</sub>: There are relationships between Race/ethnicity and amount of mild physical activity per week

Statistical Plan: Independent Variable = Race/ethnicity; Dependent Variable = Mild PA (Binary 1, 0); Statistical Test: Logistic Regression; Control Variable = Gender

Logistic regression was used to test the hypothesis for research question 3. The dependent variable is physical activity; which was divided into mild, moderate and strenuous activity. The independent variable was race/ethnicity. In table 10; there was no support against the null hypothesis. For mild activity  $p = 0.8$  for Whites,  $p = 0.57$  for Blacks or

African American; and  $p = 0.44$  for Virgin Islanders. The  $p$  value for moderate physical activity  $p = 0.52$  for Whites,  $p = 0.9$  for Blacks and  $p = 0.92$  for Virgin Islanders. For Blacks or African American  $p = 0.88$ , Virgin Islanders  $p = 0.9$  and Caribbean  $p = 0.4$ . The data is consistent with the null hypothesis. Table 10 examines these results.

Table 10

*Logistic Regression and Influence of Race/Ethnicity on Physical Activity*

Race/ethnicity physical activity	Std. error	Wald	Df	Sig	95% confidence interval	
					Lower bound	Upper bound
<b>Mild Activity</b>						
White	.971	.050	1	.823	-1.687	2.121
Black or African American	.903	.318	1	.573	-2.279	1.260
Hispanic or Latino	1.025	.343	1	.558	-2.609	1.409
American Indian	1.559	.066	1	.797	-2.654	3.456
Virgin Islander	.912	.589	1	.443	-2.488	1.088
Caribbean	.917	.419	1	.518	-2.391	1.204
<b>Moderate Activity</b>						
White	.963	.413	1	.520	-1.268	2.506
Black or African American	.895	.000	1	.998	-1.753	1.757
Hispanic or Latino	1.018	.118	1	.731	-1.646	2.345
American Indian	1.528	.002	1	.963	-3.064	2.924
Virgin Islander	.904	.009	1	.925	-1.687	1.858
Caribbean	.910	.018	1	.893	-1.906	1.660
<b>Strenuous Activity</b>						
White	.968	.246	1	.620	-1.417	2.377
Black or African	.901	.022	1	.882	-1.900	1.634

America						
Hispanic or Latino	1.026	.018	1	.893	-2.149	1.872
American Indian	1.532	.202	1	.653	-2.313	3.690
Virgin Islander	.910	.000	1	.986	-1.768	1.801
Caribbean	.918	.532	1	.466	-2.469	1.129

*Note.* Questions adapted with permission from the Eat Survey II developers; see Appendix F.

### **Reliability Cronbach's Alpha**

Internal consistency is the estimation based on the correlation among the variables (Garson, 2013). This was measured using Cronbach alpha. The reliability of survey was tested using SPSS. Cronbach's alpha determines the internal consistency construct validity (Garson, 2013). A Cronbach alpha with a 0.60 is considered acceptable for exploratory purposes, 0.8 for confirmatory purposes and 0.7 for good confirmation (Garson, 2013). The Cronbach alpha for this study was conducted for exploratory purposes. Twenty- six items related to diet and physical activity were entered into SPSS and yielded a Cronbach alpha of 0.625. This is considered acceptable for this study.

### **Transition and Summary**

The characteristics of the study population were presented in this chapter. The research questions and the hypothesis were presented and tested using ordinal logistic regression. Reliability was determined using SPSS Cronbach alpha, which was acceptable. The first research question investigated the frequency of eating meals (Breakfast, lunch and dinner) for race/ethnicity among college students. The results indicated that frequency of eating meals was significant for some race/ethnicity but not for others. There was no support for the null hypothesis for frequency of eating dinner

and lunch meals. The second research question investigated the relationship between race/ethnicity and parents influenced on eating. The results indicated that there are no significant relationships between race/ethnicity and parental influences of meal consumption. There was no relationship between race/ethnicity and physical activity. Chapter 5 discusses interpretation of findings related to research and theoretical framework, recommendations for future research, implication for social change, limitations of the study and recommendations for public health.



## Chapter 5: Interpretation and Recommendations

### Overview

The purpose of this study was to examine the impact of race/ethnicity on dietary and physical activity habits of college students in the U.S. Virgin Islands. College students, especially those from minority groups, are at risk for leading unhealthy lifestyles resulting in negative health outcomes created by inadequate dietary intake and physical inactivity (Neumark-Sztainer, Larson, Fulkerson, Eisenberg, & Story, 2010). Public health officials are concerned because unhealthy behaviors lead to obesity, heart disease, cancer, diabetes, and stroke (CDC, 2013). The prevalence of physical inactivity is higher in racial minorities compared to any other subgroups; race differences in health behaviors among college students have not been studied conclusively (McArthur & Raedeke, 2009).

As students from other islands transition to college life at the University of the Virgin Islands, they have limited meal choices offered at the college cafeteria. The new campus environment may limit the availability and frequency of meals or their knowledge of foods' availability, leading to changes in behavioral capability (knowledge of skill). In addition, their ability to learn and maintain their behaviors are affected by decreased or lack of parental influence. The native students also begin to change their eating patterns as they spend most of the day out of their family home.

Although literature exists about the diet and physical activity behaviors of college students in the United States, little is known about the lifestyle of college students from racially/ethnically heterogeneous backgrounds and how the transition to the campus

environment and new situations affects their behavioral capability to control their diet and physical activity (McArthur & Raedeke, 2009).

The student population studied represented a sample from a different racial/ethnic setting that allowed the examination of theoretical constructs in a more heterogeneous racial and cultural population with much less exposure to the factors that have contributed to the obesity epidemic on the mainland. This chapter addresses interpretations of the study, application of findings to the theory, and implications for positive social change, as well as the need for further research.

### **Sample of College Students**

Several studies have concluded that gender and ethnicity are related to physical activity (Arcan et al., 2007; Aruguete, DeBord, Yates, & Edman, 2005; Kuchler & Lin, 2002; Neumark-Sztainer et al., 2008), and other studies have concluded that race is not significantly related to physical activity (Haff, 2011; McArthur & Raedeke, 2009; Stanziano & Butler-Ajibade, 2011). Hala and Ray (2006) indicated that gender and race were significant in physical activity because of culture. Jeffery (2013) stated that gender was significant to physical activity for other reasons, such as weight and stress management. Data from the CDC (2010a) suggested that gender was significant in fruit and vegetable consumption. Other studies have suggested a need for further research on these associations (Huang et al., 2003; Stanziano & Butler-Ajibade, 2011; Vella-Zarb & Elgar, 2010).

Schembre, Nigg, and Albright (2011), in their study of BMI and race, found that race was not significant in relation to BMI. Freedman (2010) concluded that there was a

relationship between race and weight gain; however, race was significant when comparing weight gain in students who lived on and off campus, and more studies needed to be conducted to examine the contribution of race to the dietary habits of multiethnic populations. Willis, Isasi, Mendoza, and Ainette (2007) concluded that gender and race are related to exercise patterns, with increasing perceived barriers to exercise associated with less likelihood of exercising, and found that gender strongly influences type of exercise.

### **Interpretation of Findings**

The first research question sought to determine the extent to which race modifies the behaviors of weekly frequency of eating meals among college students in the U.S Virgin Islands. The results indicated that frequency of eating meals for breakfast was significant for Hispanic and Caribbean students. Ethnicity/race significantly predicted consumption of dinner meal for Whites, Hispanic, Virgin Islander, and Black or African American. This study suggests that there is a correlation between specific races and how students consume breakfast, lunch, and dinner.

Frequency of eating meals for breakfast was significant for Hispanic ( $p < .038$ ) and Caribbean students ( $P < .045$ ). Ethnicity/race significantly predicted consumption of dinner meal ( $p = 0.00$ ) for Whites, Hispanic, Virgin Islander, and Black or African American. There is support for the null hypothesis for lunch however there is no support for the null hypothesis for consumption of dinner and breakfast meals so the alternative hypothesis was favored. The data appeared to be consistent with the null hypothesis

where there were no relationships between race/ethnicity and parental influences on meal consumption for research question 2.

Research Question 3 concerned the extent to which race/ethnicity influenced physical activity among college students in the U.S Virgin Islands. The results indicated that there was no correlation between physical activity and race among college students in the Virgin Islands. This study was consistent with some of the literature that concluded that race was not related to physical activity. Studies such as Haff (2011) and McArthur and Raedeke (2009) found that race was not significantly related to physical activity. Stanziano and Butler-Ajibade (2011) and Hala and Ray (2006) indicated that gender and race were significant in physical activity because of culture. Several studies concluded that gender and ethnicity were related to physical activity (Arcan et al., 2007; Aruguete, DeBord, Yates, & Edman, 2005; Kuchler & Lin, 2002; Neumark-Sztainer et al., 2008). However, Jeffery (2013) stated that gender was significant to physical activity for other reasons, such as weight and stress management. It can be concluded that more research needs to be conducted to determine other factors that could have contributed to the outcome of the null hypothesis.

### **Application of Findings to Theoretical Framework**

Social cognitive theory is applicable to public health and health behavior because it addresses cognitive, emotional, and behavioral understandings of positive behavior change. The theory was relevant to this study because it addresses cognitive, emotional, and other aspects of behavior that affect behavior change among college students in the U.S Virgin Islands. Social cognitive theory involves several concepts; those that were

used for this study were environment, situation, and observational learning. Environment refers to factors that are external to the person (Glanz, Rimer, & Lewis, 2002).

Environment includes family, friends, peers, and availability of food. Situation refers to the person's perception of the environment (Glanz, Rimer, & Lewis, 2002).

Observational learning, another concept, is the behavioral achievement that occurs by observing the actions and outcomes of others (Glanz, Rimer, & Lewis, 2002).

The environmental construct was represented by the question concerning whether fruits and vegetables were cooked where the participant lived. The students responded to indicate how often fruits and vegetables were cooked where they lived; 43.3% responded that fruits and vegetables were cooked 5-6 days of the week, and 5.5% responded that fruits and vegetables were never cooked (Table 7). According to the results, fruits and vegetables were cooked in 43.3% of the students' places of residence. This indicated that environmental factors such as having access to fruits and vegetables did not have an influence on race/ethnicity in college students in the Virgin Islands. It seems as though other factors had some influence on race.

The situation construct was measured with a question on the availability of fruits and vegetables at the student's place of residence; 44% of the students stated that fruits and vegetables were available, while 2% responded that fruits and vegetables were not available. The observational construct was tested by parental concern about a healthy diet; 49% of the students answered that their parents cared about a healthy diet. The results indicated that parents do not have an influence on the diet of college students in the Virgin Islands. The results indicated that 46% of the students stated that their parents

cared about physical activity. The results suggest that there could be some significance in how parents care about diet and physical activity, but the patterns of response were not over the 50<sup>th</sup> percentile, and statistical significance was not detected. More research is needed to determine which other factors are significant.

### **Implications for Positive Social Change**

The results of the study indicated that race/ethnicity played some role in diet, specifically frequency in consumption of meals. Frequency of eating meals for breakfast was significant for Hispanic and Caribbean students, while ethnicity/race predicted the consumption of dinner for Whites, Hispanic or Latino, Virgin Islander, and Blacks, or African American. The results in the study have expanded the knowledge of race/ethnicity diet and physical activity among college students in the U.S Virgin Islands and have added to the body of literature in this area.

Understanding physical activity and diet from a health promotion perspective and how race influence these choices will help policy creators and health education specialists understand how race/ethnicity predicts consumption of meals so that specific intervention programs can be created for each group. The results will help to develop effective programs that can tailor to each race. Although physical activity is not correlated to race/ethnicity according to the results of the study, further research can be conducted to determine how gender predicts race/ethnicity and physical activity of college students in the Virgin Islands. The results of the study will be shared with other Caribbean Islands so that they too can create specific interventions for specific ethnic groups. Administrators, policy makers, health educators will become aware of these specific correlates and

change or develop health education and promotion programs to educate the general public. Parents will be able to improve their health behaviors to positively influence the health behaviors of their children. These positive health behaviors of students may reduce the prevalence of obesity

This not only adds to the literature on college students' diet, and physical activity but also adds to the knowledge about college students in the U.S. Virgin Islands. College students became aware of their own personal choices and how their race can influence their health behavior choices. They should be able to change their behaviors and educate their families and friends based on the data from this study. The data can be used by health professionals, the local governments, policy makers and educators to develop programs and interventions that would influence healthy diet and physical activity choices based on ethnicity. The will be shared with other islands in the Caribbean as well as the United States for the development of interventions designed specially designed to address this issue through peer reviewed publications, executive summaries and articles in the local newspaper.

### **Limitations of Study**

The study was conducted on the St. Thomas campus. It was costly to travel to the St. Croix's campus, and as a result, the population may not be representative of the entire University's student population. The results were only applied to the Island of St. Thomas, but the recommendations were applied to the entire university both on St. Thomas and St. Croix. The study used a convenience sample because the University does not distribute the listing of students' name to third parties and to student researchers. The

data collection started close to the end of the spring semester, some data were collected from summer school students. However, at the start of the fall semester the majority of the data were collected, this however did not affect the data collection process or the analysis of the data. Another limitation was the sites chosen for the data collection such as health center, wellness centers, student activity center, cafeteria and dorms might have influenced the way the students responded to the surveys and possibly may have influenced each other on the responses. The study was based on primary data collected from students; however the responses gave the researcher an idea of the students' health behaviors based on the influence of ethnicity.

### **Recommendations for Action and Future Research**

Limited studies have been conducted regarding race, diet and physical activity on college students in the U.S Virgin Islands. This study has provided information that will add to the current body of knowledge about college students in the U.S Virgin Islands. Although race/ethnicity predicts the frequency of eating meals for some races and not for the others, more research is needed to determine if other factors prevented a negative outcome for the other races. The Virgin Islands population of college students is so diverse that other factors could have an effect on the outcome. Frequency of eating meals for lunch was not significant but ethnicity/race significantly predicted consumption of dinner meal for Whites, Hispanic, Virgin Islander and Black or African American and Breakfast meal for Hispanic and Caribbean Students. More research is needed to determine if other factors influenced the outcomes. The results also indicated that race/ethnicity does not influence physical activity for the population examined. The



results of the study are consistent with other studies on college students which stated that race does not play a role in physical activity. However, more research need is needed to examine gender differences to determine if gender is significant in race/ethnicity and physical activity.

### **Conclusion**

The environment that college students face is challenging and can contribute to physical inactivity and reduce consumption meals which can lead chronic diseases. The purpose of this study was to examine how race/ethnicity impacts behavioral capability of college students in the U.S Virgin Islands. The study was guided by the social cognitive theory. The research questions examined whether race/ethnicity impacted diet and physical activity among college students. Literature review conducted was inconclusive. Frequency of eating meals for lunch was not significant for all races; however, ethnicity/race significantly predicted consumption of dinner meal for Whites, Hispanic, Virgin Islander, and Black or African American and breakfast meal for Hispanic and Caribbean students. There was no relationship between parental influence and the consumption of meals for all races. This study was consistent with some of the literature that concluded that race was not related to physical activity. It can be concluded that more research needs to be conducted to determine other factors that could have contributed to the outcome of the null hypothesis.

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## Appendix A: Modified EAT Survey II for College Students

This is a modified version of the EAT Survey II for colleges students.

The original survey explores issues related to eating patterns and weight concerns among young people. It follows up on a survey that you and thousands of other teenagers completed nearly five years ago. The information you provided is helping us to develop health and nutrition programs for youth. Your help with this project is greatly appreciated.

Please answer every question carefully. Your name will NOT be on the survey, so no one will know who you are. Please be as honest as you can in your responses.

### MARKING DIRECTIONS:

- Mark your answers with a pencil or pen
- Erase cleanly any answer you want to change
- Make NO stray marks anywhere on the questionnaire

If you have any questions with completing the questionnaire please email Ronda Herbert (researcher) at [ronda.herberthatchett@waldenu.edu](mailto:ronda.herberthatchett@waldenu.edu).

THANK YOU for completing the Project EAT survey

Let's START with some GENERAL QUESTIONS about YOU

**1. What is today's date?** \_\_\_\_ / \_\_\_\_ / \_\_\_\_  
**mo day yr**

**2. Are you**

1. Male
2. Female

**3. What is your age?**

1. 18
2. 19
3. 20
4. 21
5. 22
6. 23
7. 24

**4. Do you think of yourself as . . . (You may choose more than one.)**

1. White
2. Black or African American
3. Hispanic or Latino
4. Asian American
5. Hawaiian or Pacific Islander
6. American Indian or Native American
7. Virgin Islander
8. Caribbean West Indian
9. Other

**5. During the past year, where did you live for the majority of the time?**

1. Rent or share rent
2. Parent's home
3. Residence hall
4. fraternity/sorority
5. Own a house
6. Other (please specify) \_\_\_\_\_

**6. During the past month, where did you live for the majority of the time?**

1. Rent or share rent
2. Parents' home
3. Residence hall
4. fraternity/sorority
5. Own a house
6. Other (please specify) \_\_\_\_\_

**7. During the past year, with whom did you live the majority of the time? (Mark all that apply.)**

1. I live alone
2. My parent(s)
3. Roommates, friends
4. My husband/wife
5. My partner of the opposite sex
6. My partner of the same sex
7. My child(ren)
8. My brothers/sisters
9. Other \_\_\_\_\_

**8. Which of the following best describes your student status over the past 12 months?**

1. Not a student

2. Part-time student at a community or technical college 65
3. Full-time student at a community or technical college
4. Part-time student at a four-year college
5. Full-time student at a four-year college

**9. Are you on a college dining plan (e.g., residence hall, fraternity/sorority)?**

1. No
2. Yes, for some meals
3. Yes, for most meals
4. Yes, for all meals

**Your EATING HABITS . . .When, why, how, and what?**

**10. During the past week, how many days did you eat *breakfast*?**

1. Never
2. 1-2 days
3. 3-4 days
4. 5-6 days
5. Every day

**11. During the past week, how many days did you eat *lunch*?**

1. Never
2. 1-2 days
3. 3-4 days
4. 5-6 days
5. Every day

**12. During the past week, how many days did you eat *dinner*?**

1. Never
2. 1-2 days
3. 3-4 days
4. 5-6 days
5. Every day

**13. In the past week, where did you eat dinner most often? (Mark only one.)**

1. My own home/apartment
2. My parents' home
3. Dining or residence hall (e.g., dorm, fraternity house)
4. Fast food restaurant
5. Another type of restaurant
6. Car or other transportation
7. Other \_\_\_\_\_



**14. In the past week, how often did you eat something from a fast food restaurant (like McDonald's, Burger King, Hardee's, etc.)?**

1. Never
2. 1-2 times
3. 3-4 times
4. 5-6 times
5. 7 times
6. More than 7 times

**15. How many times did you snack (eat in between meals) yesterday?**

1. None
2. 1 time
3. 2-3 times
4. 4-5 times
5. More than 5 times

**16. How adequate is/are your . . .**

*Very inadequate Inadequate Adequate Very adequate*

- a. cooking skills?
- b. money to buy food?
- c. appliances for food preparation(e.g., stove, oven, fridge)?
- d. the selection of foods in stores near you?
- e. time available to prepare food?

**17. During the past 12 months, about how often have you . . .**

*Never; 1-2 time past year; 4-5 times past year; Monthly; Weekly; Daily*

- a. bought fresh vegetables at the grocery store?
- b. written a grocery list before shopping?
- c. prepared a green salad
- d. prepared a dinner with chicken or fish or vegetables?
- e. prepared an entire dinner for 2 or more people?

**18. How much do you care about . . .**

*Not at all A little bit Somewhat Very much*

- a. eating healthy food?
- b. controlling your weight?
- c. staying fit and exercising?
- d. being healthy
- e. how you look?

**19. How strongly do you agree with the following statements?**

**The types of food I eat affect:**

*Strongly disagree Disagree Agree Strongly agree*

- a. my health
- b. how I look
- c. my weight

**20. How strongly do you agree with the following statements?**

*Strongly; Disagree; Agree Strongly; Agree*

- a. I like the taste of potato chips and other salty snack foods
- b. Milk tastes good to me
- c. Most unhealthy foods taste better than healthy foods
- d. I think a lot about being thinner
- e. I am too busy to eat healthy foods
- f. I like the taste of most fruits
- g. I am worried about gaining weight
- h. I am too rushed in the morning to eat a healthy breakfast
- i. I don't have time to think about eating healthy
- j. I like the taste of dark bread (e.g., whole wheat)
- k. I like the taste of fast foods (e.g., McDonald's)

**21. How strongly do you agree with the following statements?**

*Strongly; Disagree Agree Strongly agree*

- a. People my age don't need to be concerned about their eating habits
- b. At this point in my life, I am not very concerned about my health
- c. People my age don't need to worry about their health
- d. Eating healthy meals just takes too much time
- e. Most vegetables taste bad
- f. I sometimes skip meals since I am concerned about my weight
- g. Most healthy foods just don't taste that great
- h. I weigh myself often
- i. Foods from fast food restaurants are generally unhealthy

**22. How often are the following true?**

*Never Sometimes Usually Always*

- a. Fruits and vegetables are available where I live
- b. Vegetables are served at dinner where I live
- c. We have 'junk food' where I live
- d. Fruit juice is available where I live
- e. Milk is served at meals where I live
- f. Potato chips or other salty snack foods are available where I live
- g. Chocolate or other candy is available where I live
- h. Soda pop is available where I live
- i. Dark bread (e.g., whole wheat) is available where I live

**23. If you wanted to, how sure are you that you could eat healthy foods when you are . . .**

*Not at all sure; Very sure*

- a. stressed out
- b. feeling down
- c. bored

**24. How confident are you that you could change or maintain your eating patterns so that you could . . .**

*Not at all confident; Very confident*

- a. eat at least two servings per day of fruit
- b. eat at least three servings per day of vegetables
- c. eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)
- d. eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)
- e. limit soda pop to one can per day or less
- f. limit eating at fast food restaurants to once per week or less

**25. Are you a vegetarian now?**

- 1 yes
- 2 no

**26. What are your main reason(s) for eating a vegetarian diet? (Mark all that apply.)**

- 1 to lose weight or keep from gaining weight
- 2 want a healthier diet
- 3 to help the environment
- 4 religious reasons
- 5 do not want to kill animals
- 6 a family member is a vegetarian
- 7 I don't like the taste of meat
- 8 other (please specify) \_\_\_\_\_

**FAMILY & FRIENDS may affect your eating habits, so we'd like to know more about them.**

**Some questions in this section ask about your mother or your father. If you do not have a mother or father, it is okay to skip those questions.**

**27. My mother . . .**

*Not at all A little Somewhat Very much*

- a. cares about eating healthy food
- b. cares about staying fit and exercising

- c. diets to lose weight or keep from gaining weight
- d. encourages me to eat healthy foods
- e. encourages me to be physically active
- f. encourages me to diet to control my weight

**28. My father . .**

*Not at all A little Somewhat Very much*

- a. cares about eating healthy food
- b. cares about staying fit and exercising
- c. diets to lose weight or keep from gaining weight
- d. encourages me to eat healthy foods
- e. encourages me to be physically active
- f. encourages me to diet to control my weight

**29. Many of my friends . . .**

*Not at all A little Somewhat Very much I don't know*

- a. care about eating healthy food
- b. care about staying fit and exercising
- c. diet to lose weight or keep from gaining weight

**30. How strongly do you agree with the following statements?**

*Strongly disagree; Somewhat disagree; Somewhat agree; Strongly agree*

- a. I enjoy sitting down with family or friends and eating a meal together
- b. It is important to sit down and eat at least one meal a day with other people (family or friends)
- c. I usually eat dinner with other people

**31. How strongly do you agree with the following statements?**

*Strongly disagree; Somewhat disagree; Somewhat agree; Strongly agree*

- a. It is hard to find time to sit down and eat a meal
- b. I tend to "eat on the run"
- c. Regular meals are important to me
- d. I eat meals at about the same time every day

**In a usual week, how many hours do you spend doing the following activities:**

**32. Strenuous exercise (heart beats rapidly)**

**Examples: Biking fast, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, lacrosse, tennis, cross-country skiing, soccer, basketball, football**

- 1. none

2. less than 1/2 hour a week
3. 1/2 - 2 hours a week
4. 2 1/2 - 4 hours a week
5. 4 1/2 - 6 hours a week
6. 6+ hours a week

**33. Moderate exercise (not exhausting)**

**Examples: Walking quickly, baseball, gymnastics, easy bicycling, volleyball, skiing, dancing, skateboarding, snowboarding**

1. None
2. Less than 1/2 hour a week
3. 1/2 - 2 hours a week
4. 2 1/2 - 4 hours a week
5. 4 1/2 - 6 hours a week
- 6 6+ hours a week

**34. Mild exercise (little effort)**

**Examples: Walking slowly (to school, to friend's house, etc.), bowling, golf, fishing, snowmobiling, yoga**

1. None
2. Less than 1/2 hour a week
3. 1/2 - 2 hours a week
4. 2 1/2 - 4 hours a week
5. 4 1/2 - 6 hours a week
6. 6+ hours a week

THANK YOU for completing the Project EAT survey!

## Appendix B: Consent Form

### **The Relationship between Ethnicity, Diet and Physical Activity Study**

#### **Consent Form**

You are invited to take part in a research study of race/ethnicity, diet and physical activity behaviors among college students at the University of the Virgin Islands, St.

Thomas Campus. You are invited to participate in the study because you are a college student attending the University of the Virgin Islands. The researcher is inviting all fulltime undergraduate students of the University of the Virgin Islands to be in the study.

This form is part of a process called “informed consent” to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Ronda Herbert, who is a doctoral student at Walden University.

#### **Background Information:**

The purpose of this study is to examine the impact of race/ethnicity on dietary and physical activity behaviors of college students in the U.S. Virgin Islands.

#### **Procedures:**

If you agree to be in this study, you will be asked to:

- Complete the survey questionnaire which should take about 15 minutes to complete.
- You will be asked to complete this survey only once.

Here are some sample questions:

#### **9. Are you on a college dining plan (e.g., residence hall, fraternity/sorority)?**

1. No
2. Yes, for some meals
3. Yes, for most meals
4. Yes, for all meals

**10. During the past week, how many days did you eat *breakfast*?**

1. Never
2. 1-2 days
3. 3-4 days
4. 5-6 days
5. Every day

**Voluntary Nature of the Study:**

This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at the University of the Virgin Islands will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind during or after the study. You may stop at any time.

**Risks and Benefits of Being in the Study:**

Being in this study would not pose risk to your safety or wellbeing. The significant of this study are:

- Identifying diet and physical activity correlates may help in the development of specific health promotion programs and interventions that tailored to the needs, interests and demographics of college students in the Virgin Islands
- Study results will add to the literature on college students' diet and physical activity
- Study results but will add to the knowledge about college students diet and physical activity in the U.S. Virgin Islands since no literature was found on diet and physical activity behaviors among college students in the U.S Virgin Islands.

**Payment:**

There is no payment to complete this survey.

**Privacy:**

Any information you provide will be kept anonymous. You will not place your name on the questionnaire. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by placing the data in a locked box. Data will be kept for a period of at least 5 years, as required by the university.

**Contacts and Questions:**

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email [ronda.herberthatchett@waldenu.edu](mailto:ronda.herberthatchett@waldenu.edu). If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is IRB # 03-14-14-0110147 which expires March 2015.

Please keep this consent form for your records.

**Statement of Consent:**

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below, I understand that I am agreeing to the terms described above.

Printed Name of Participant

Date of consent

Participant's Signature

Researcher's Signature

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## Appendix C: Letter of Request to Place Locked Drop Box

To Whom this May Concern

My name is Ronda Herbert, a doctoral student at Walden University. I am presently conducting a study of race/ethnicity, diet and physical activity behaviors among college students at the University of the Virgin Islands. College student attending the University of the Virgin Islands are asked to participate. Locked boxes will be placed around campus for students to place completed surveys.

I am requesting permission to place a locked box in your area that will be used to collect completed surveys. I will collect the surveys daily.

If you agree to have a drop box in your area please contact me at email [ronda.herberthatchett@waldenu.edu](mailto:ronda.herberthatchett@waldenu.edu). I will contact you to follow up.

Thanking you in advance

Ronda Herbert  
Doctoral student  
Walden University

## Appendix D: Flyer Advertising Research Study

**New Research Study  
For Fulltime Undergraduate College Students****Would you like to contribute to data about your race/ethnicity?****Here is your chance!**

You are invited to take part in a research study of race/ethnicity, diet and physical activity behaviors among college students at the University of the Virgin Islands, St. Thomas Campus. You are invited to participate in the study because you are a college student attending the University of the Virgin Islands. The researcher is inviting all fulltime undergraduate students of the University of the Virgin Islands to participate in the study. The survey is strictly voluntary and you will be asked to complete the survey questionnaire which should take about 15 minutes to complete

**Purpose**



The purpose of this study is to examine the impact of race/ethnicity on dietary and physical activity behaviors of college students in the U.S. Virgin Islands.



For more information on this study please email Ronda Herbert (Researcher) by email [ronda.herberthatchett@waldenu.edu](mailto:ronda.herberthatchett@waldenu.edu)

## Appendix F: Permission Letter From Project EAT Developer

Letter copied and pasted from email.

Subject : RE: Project Eat Survey  
 Date : Wed, Dec 28, 2011 04:46 PM CST  
 From : [Nicole Larson <larsonn@umn.edu>](mailto:larsonn@umn.edu)  
 To : [Ronda Herberthatchett <ronda.herberthatchett@waldenu.edu>](mailto:ronda.herberthatchett@waldenu.edu)  
 Reply To : [Nicole Larson <larsonn@umn.edu>](mailto:larsonn@umn.edu)  
 Attachment  [EAT-](#)  
 : [II Survey \[Young adults, cohort 1\].pdf](#)  


Dear Ronda, You are welcome to use items from the EAT survey attached here for your dissertation, but please give credit to the study using the citations in the attached PDF. I also recommend reviewing the survey carefully to ensure the items you select are relevant to your population as generally others adapt survey items and select only items from the survey that best fit their needs. There is no MSWord version of the survey available but you can easily cut and paste from the PDF.

All the best, Nicole

**From:** Ronda Herberthatchett [mailto:[ronda.herberthatchett@waldenu.edu](mailto:ronda.herberthatchett@waldenu.edu)]  
**Sent:** Wednesday, December 28, 2011 3:10 PM  
**To:** [larsonn@umn.edu](mailto:larsonn@umn.edu)  
**Subject:** Project Eat Survey

Good day,

My name is Ronda Herbert; I am a Doctoral Public Health Student at Walden University and I am in the process of writing my proposal for my dissertation. I am interested in using the Project EAT Survey for my data collection instrument. My topic for the dissertation involves college students' ages 18-24 years old, diet and physical activity in the United States Virgin Islands.

I am requesting if you can send a word copy document of the survey. I was looking at the Survey online and because the study will be done in the Virgin Islands (Caribbean) some ethnicity category might need to be added. That is the only category of the survey items data will be added to.

I am kindly requesting the use of the survey for my dissertation; the one that involves 18-23 year old teens. I would appreciate the Microsoft Word version of the survey as well.

Please let me know what is the procedure for using the survey and for obtaining a Microsoft Word version of the survey.

I look forward to a favorable reply.

Regards

Ronda Herbert, RN, BSN, MSPH

## Appendix G: University of the Virgin Islands IRB Approval Letter

Letter copied from email

UVI Approval IRB Approval Letter

Please note that University of the Virgin Islands IRB has taken the following action on IRBNet:

Project Title: [582491-1] The Examination of Race/Ethnicity on Dietary and Physical Activity Behaviors among College Students in the US Virgin Islands.

Principal Investigator: Ronda Herbert, BSN, MSPH

Submission Type: New Project

Date Submitted: March 17, 2014

Action: APPROVED

Effective Date: April 23, 2014

Review Type: Full Committee Review

Should you have any questions you may contact Olusola Ewulo at [olusola.ewulo@live.uvi.edu](mailto:olusola.ewulo@live.uvi.edu).

Thank you,

The IRBNet Support Team

[www.irbnet.org](http://www.irbnet.org)